A257f

LIBRARY
MAR 9 1961
FISH & WILDLIFE SERVICE

#358
D
C
B-HBL pat.

Biological and Oceanographic Observations in the Central North Pacific July — September 1958

SPECIAL SCIENTIFIC REPORT — FISHERIES No. 358

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

United States Department of the Interior, Fred A. Seaton, Secretary
Fish and Wildlife Service, Arnie J. Suomela, Commissioner
Bureau of Commercial Fisheries, Donald L. McKernan, Director

BIOLOGICAL AND OCEANOGRAPHIC OBSERVATIONS IN THE CENTRAL NORTH PACIFIC JULY-SEPTEMBER 1958

By

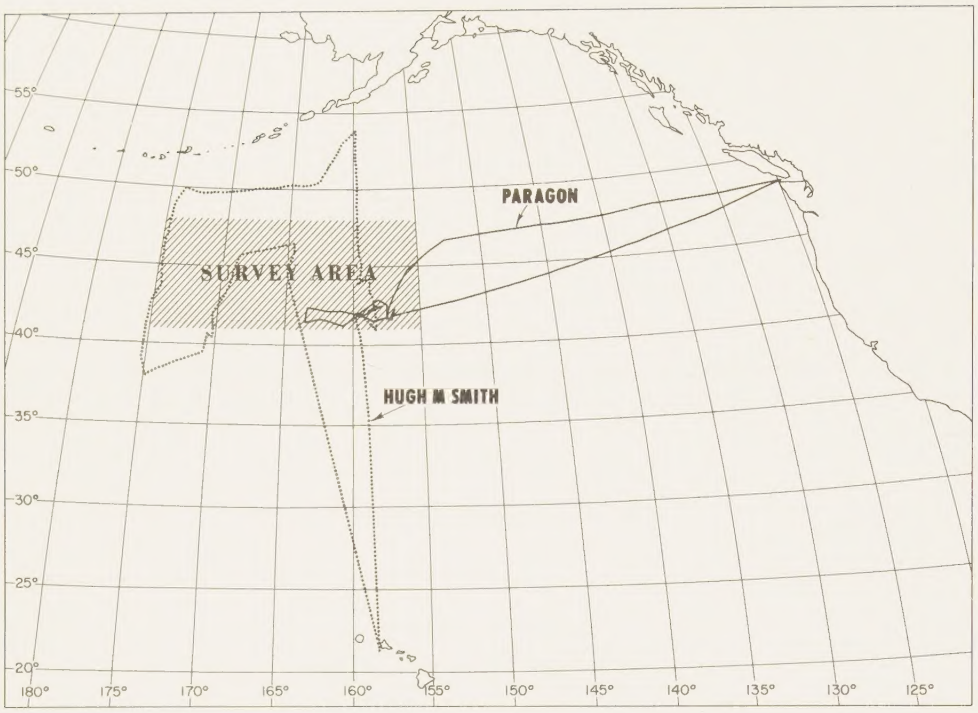
James W. McGary, Oceanographer

and

Joseph J. Graham
Fishery Research Biologist
Honolulu Biological Laboratory

United States Fish and Wildlife Service
Special Scientific Report: Fisheries No. 358

Washington, D. C.
December 1960



Frontispiece: Chart of the Northeastern Pacific showing tracks of Hugh M. Smith cruise 46 (broken line) and M/V Paragon (solid line).

ABSTRACT

This report contains the biological (including fishing) and oceanographic data collected in the central North Pacific during the July-September 1958 period from the U. S. Bureau of Commercial Fisheries research vessel Hugh M. Smith and the M/V Paragon. The latter made a commercial-scale gill-net survey for albacore under a contract with the Bureau. Scientists and crew aboard the former collected oceanographic, biological, and fishing data to permit a comparison of conditions in 1958 with those of previous years. The major effort of both vessels was in the area between 155° and 175°W. longitude and from 41° to 48°N. latitude.

CONTENTS

Page

Introduction 1

Field procedures 2

Biological studies 2

Exploratory fishing 2

Tagging 5

Food studies 5

Forage organisms 5

Observation of bird flocks, fish schools, and aquatic mammals 5

Plankton volumes 5

Oceanographic studies 5

Water sampling 5

Water temperature 6

Meteorological observations 6

Subsurface illumination observations 6

Laboratory methods and techniques 6

Future publication 11

Personnel 11

Records 11

Literature cited 11

Tabulated data 13

Appendix A - carbon and phytoplankton data 97

ILLUSTRATIONS

FIGURE — Page

Frontispiece: Chart of the Northeastern Pacific showing tracks of Hugh M. Smith cruise 46 (broken line) and M/V Paragon (solid line).

1. Track chart, Hugh M. Smith cruise 46. 2
2. Schematic view of longline gear, Hugh M. Smith cruise 46 3
3. Positions of gill-net sets, M/V Paragon. 4

4-13. Temperature-depth sections (A-J), Hugh M. Smith cruise 46 7

TABLES

TABLE

1. Summary of the types of observations (except C_{14}) made at Hugh M. Smith cruise 46 stations. 13
2. List of common and scientific names and abbreviations used in HBL data for fish encountered during cruise 46 of the Hugh M. Smith and that of the M/V Paragon . . 16
3. Summary of gill-net catches, Hugh M. Smith cruise 46 17
4. Summary of gill-net catches, M/V Paragon 18
5. Summary of surface trolling, Hugh M. Smith, cruise 46 19
6. Summary of surface trolling catches, M/V Paragon. 20
7. Summary of longline catches, Hugh M. Smith cruise 46. 21
8. Length frequency distribution, by stations, of albacore caught by the gill net, Hugh M. Smith cruise 46 22
9. Length frequency distribution, by stations, of albacore caught by the gill net, M/V Paragon. 23
10. Summary of night light observations on the abundance of saury and squid, Hugh M. Smith cruise 46 24
11. Record of daily sightings of bird flocks, scattered birds, fish schools, and aquatic mammals, Hugh M. Smith cruise 46 25
12. Zooplankton station data and volumes, Hugh M. Smith cruise 46 26
13. Station curves and observed oceanographic data, Hugh M. Smith cruise 46 28
14. Summary of observations at bathythermograph casts (U. S. Navy Hydrographic Office 1956), Hugh M. Smith cruise 46. 81
15. Summary of observations at bathythermograph casts (U. S. Navy Hydrographic Office 1956), M/V Paragon 90

TABLES (cont'd)

TABLE

Page

16. Log of ship's weather observations, Hugh M. Smith cruise 46 (U. S. W. B. Form 1210F in International Ship Weather Code). 91

17. Summary of observations made at submarine photometer stations, Hugh M. Smith cruise 46. 96

Digitized by the Internet Archive
in 2025

https://archive.org/details/noaa-technical-report-nmfs-ssrf_1960-12_358

BIOLOGICAL AND OCEANOGRAPHIC OBSERVATIONS IN THE CENTRAL NORTH PACIFIC JULY-SEPTEMBER 1958

By

James W. McGary, Oceanographer

and

Joseph J. Graham
Fishery Research Biologist
Honolulu Biological Laboratory
Honolulu, Hawaii

One of the primary objectives of the Honolulu Biological Laboratory's studies of the albacore, Thunnus germo (Lacépède)[1/], has been to determine whether there are albacore in commercial quantities in the central Pacific north of the Hawaiian Islands. A series of exploratory fishing cruises was made by Honolulu Biological Laboratory (subsequently referred to as "HBL") vessels between January 1954 and December 1956. The pattern of the cruises was such that there was geographic coverage of the area during all seasons of the year (Graham 1957, Shomura and Otsu 1956, and Callaway 1957). The results indicated that the only place where albacore concentrations of commercial value occurred was within the area between 155°W. and 175°E. longitude from 42° to 48°N. latitude. Here, where previous cruises using longline and trolling gear had been relatively unsuccessful, promising gill-net catches of albacore were made from vessels of the Bureau of Commercial Fisheries' Seattle Biological Laboratory during July-August 1955 salmon surveys. The contrast between gillnetting and other types of fishing was further accentuated by the fact that in the same area and during the same period only a few albacore were caught by trolling from an HBL vessel. The John R. Manning (HBL) returned to the area during the summer of 1956 and obtained similar results: good gill-net and poor troll catches.

These results suggested that the logical next step was a commercial-scale gill-net test with supporting environmental studies to permit a comparison of the catches and conditions with those of previous years. Consequently, a commercial vessel was chartered to make a gill-net survey of the area during the summer of 1958, and a Bureau vessel was assigned to collect the supporting scientific information.

1/ Also known as Germo alalunga (Bonnaterre), Thunnus alalunga (Gmelin), and Germo germo (Lacépède).

The research vessel Hugh M. Smith was assigned to the combination oceanographic-biological survey, which included exploratory fishing to define the northern and southern limits of albacore distribution and to test the relative effectiveness of gill-nets, longlines, and trolling gear. HBL scientists aboard the Smith were also to provide the contract vessel with any data that might contribute to the success of the commercial fishing.

The Smith departed from Honolulu on July 21, 1958, and arrived in the survey area on July 28, 1958. On September 4, 1958, the survey was ended and the Smith returned to Honolulu on September 9.

The M/V Paragon was chartered from Northwest Fisheries, Inc., of Seattle, Washington to make the commercial-scale trial of gill-netting. The Paragon is a halibut schooner having an overall length of 90 feet, a beam of 19 feet 5 inches, a draft of 9 feet (empty), a maximum speed of 11.0 knots, and a cruising speed of 10.5 knots. The Paragon participated in exploratory salmon gill-net fishing in the Bering Sea-Aleutian Islands area during the summers of 1955, 1956, and 1957. In fact, it was one of the vessels, while under charter to the Seattle Biological Laboratory, from which good gill-net catches of albacore were made during the summer of 1955.

The limits of the fishing area given in the Paragon's contract included all of the area where promising catches had been made during 1955 and 1956 that were within the range of fishing vessels that might operate out of the Aleutian ports. The western limit was 175°W. longitude and the eastern limit 155°W. The northern and southern limits were 48°N. and 41°N. (see frontispiece). The selection of the actual positions of the gill-net sets within the area was left to the discretion of the Master. Trolling while underway was required during daylight hours both within the contract fishing area and

en route to and from the area. The Master of the Paragon was directed to complete the required fishing between July 20 and September 10, 1958. The required fishing consisted of either (1) sufficient sets of 7-1/2- to 8-1/2-inch (stretched measure) mesh gear to total 1,200 shackles or (2) an albacore catch of 60 tons.

The Paragon departed from Seattle, Washington on July 16, 1958, and arrived in the survey area on July 26, 1958. The 1,200-shackle fishing requirement was completed on August 30, 1958, and the vessel returned to Seattle on September 5, 1958. The track is shown in the frontispiece.

FIELD PROCEDURES

Biological Studies

Exploratory fishing.--Nineteen gill-net sets (tables 1 and 3 and fig. 1) were made from the Hugh M. Smith during 28 nights of operation in the band of 53°-66°F. surface temperatures which past cruises had shown to approximate the latitudinal limits of the mid-ocean albacore. The remaining nine nights were lost because of unsuitable weather at setting time. On only one of these nights did the weather moderate enough so that it would have been possible to retrieve the net at dawn without excessive damage. At two of the stations the wind and sea increased during the night. At station 61 the seas rolled or tangled the net to such a degree that only 1/3 of the net was fishing properly when it was retrieved. At station 68 the net was retrieved in winds having gusts up to 26 knots and the net was so badly damaged that 2 days were required to repair it. Thus, the number of nights that were suitable for gill netting was 18 out of 28 or about 65 percent.

Each of the sets from the Smith consisted of 10 shackles of 4-1/2-inch to 7-1/2-inch (stretched measure) mesh gill net. The construction details of this gear have been described by Graham and Mann (1959). At the first six stations (those between stations 22 and 40) each set consisted of one 4-1/2-, one 5-1/2-, four 6-1/2-, and four 7-1/2-inch mesh shackles. With the completion of these stations the usable shackles of 7-1/2-inch mesh gear had been reduced to three, so the number of 6-1/2-inch mesh shackles was increased to five.

Albacore were taken in seven of the gill-net sets, with a total catch of 97 fish. The largest catches were 49 albacore at station 67 (42°7'N., 175°08'W.) and 26 at station 63 (43°29'N., 174°48'W.) (table 3 and fig. 1).

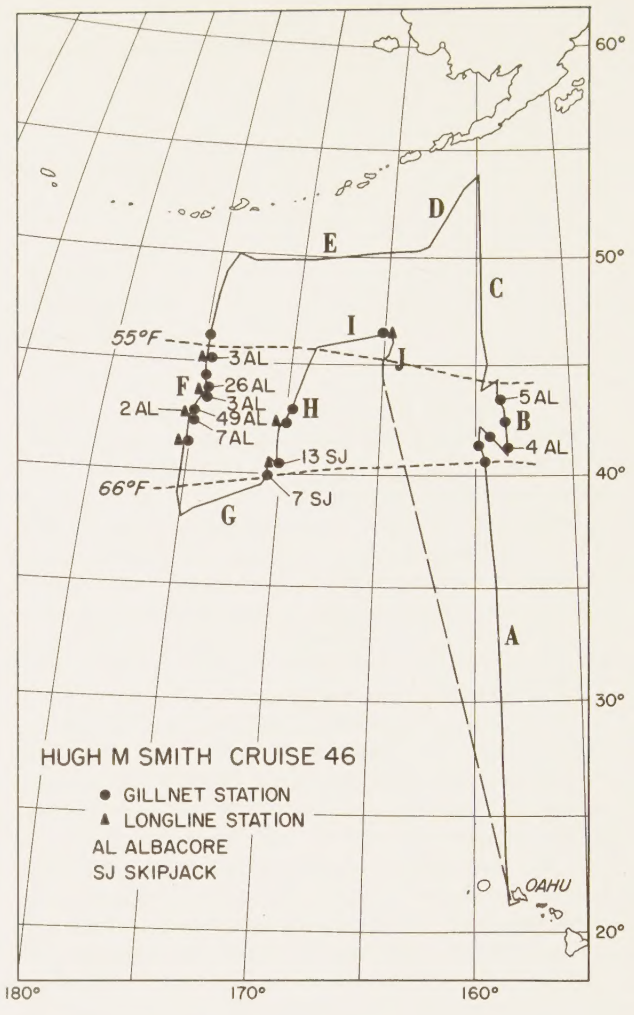


Figure 1.--Track chart, Hugh M. Smith cruise 46, July 21 to September 9, 1959, showing gill-net and longline stations. Letters and solid lines designate the location of temperature sections shown in figures 4 to 13.

Second sets at these stations produced 7 and 3 albacore, respectively. Catches at the other three stations were 3, 4, and 5 albacore. Catches of species other than albacore tuna are also listed in table 3. Five lines were trolled from the Smith during daylight hours, at a speed of 6.5 knots, when in areas having surface temperatures between 52° and 72°F. Two lines were trolled at standard speed (9 knots) during daylight hours in all other areas. Within the 52°-72°F. surface temperature range it was occasionally necessary to reduce the number of lines to avoid tangling during rough weather or to increase to standard speed after longline stations or between north-south transects in order to obtain the desired gill-net station spacing. The trolling results are summarized in table 5.

Trolling patrols were made along the longline to compare the catch of albacore by the two types of gear. Since fog frequently made it inadvisable to venture more than a quarter of a mile from the longline, the patrols were limited to 3 hours to avoid the possibility of unduly interfering with the fishing of the shallow hooks of the longline gear.

Thirteen albacore were taken during the 212 hours of trolling in water having surface temperatures between 52° to 72°F. There were two catches of two albacore each. The others were taken singly, even though a thorough sweep of the area was made after each strike.

Seven sets of shallow longline gear were made from the Smith at the positions indicated in figure 1 and in tables 1 and 7. All longline sets either preceded or followed a gill-net set. Each consisted of 20 baskets of 12-hook gear with a buoy on the mainline at each dropper, so that the fishing depth depended solely on the length of the dropper. Each basket had three 12-, three 24-, three 48-, and three 96-foot droppers, arranged as shown in figure 2. The gear was set at daylight and allowed to fish a minimum of 6 hours.

Only two albacore were taken on the longline. Both were taken at station 67(42°48'N., 175°03'W.), one on a 24- and the other on a 48-foot dropper. Both were taken within the mixed layer; the thermocline depth was 50 feet. The longline catches are summarized in table 7.

No difficulties were encountered in setting the longline, but it was difficult to retrieve. The shallowness of the line and the varying depth of the droppers made it very liable to distortion by differences in local ocean currents and by the struggles of hooked fishes. Large curves usually formed in the mainline, and at several of the stations one or more of the end baskets doubled back on the mainline. There was considerably more tangling of the droppers on the mainline than occurs with conventional longline gear. An unsuccessful attempt to overcome this difficulty by using smaller floats, which would just keep the line afloat, was made at station 90. Hooked sharks sounded with the line, and the resulting mixture of shallow and deep sections of the mainline and added horizontal distortion only increased the difficulty of retrieving the line.

Table 8 gives the length frequency distributions of the albacore caught by gill net from the Smith. The lengths of albacore taken on troll lines and longline are given in tables 5 and 7, respectively.

The crew of the Paragon completed the 1,200-shackle contract requirement by fishing 30 sets of 40 shackles each. The first set was made on July 26, 1958, and the final set on August 30, 1958. The positions of the sets are shown in figure 3. The 30 sets were completed in only 35 nights largely because it was possible to work from the vessel in winds up to approximately 25 knots. Of the five nights not fished, only three were lost because of bad weather at setting time. The other two were lost because the seas which resulted from the 40-50 knot winds that developed during set No. 21, on the night of August 17, 1958, rolled and tangled the

Figure 2.--Schematic view of a basket of longline gear used on Hugh M. Smith cruise 46.

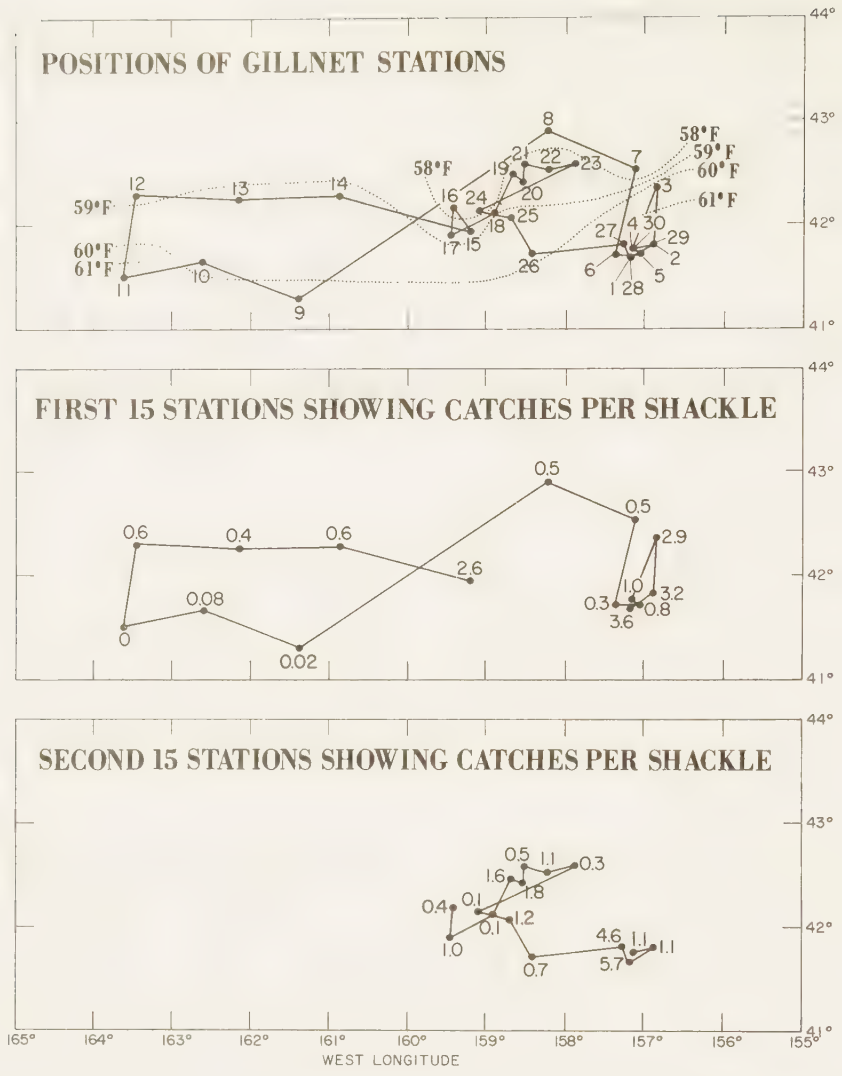


Figure 3.--Positions of gill-net sets made from the M/V Paragon (upper panel) and catch rates per shackle (middle and lower panels), July-August 1958.

net so badly that 3 days were required to repair it. Thus, allowing for the night when high winds developed during the set, 31 out of 35, or about 89 percent, of the nights were suitable for fishing with gill net from the Paragon.

The dimensions of the shackles specified in the contract were a minimum of 50 fathoms (300 feet) in length, 5 fathoms (30 feet) in depth, and 7-1/2 inches to 8-1/2 inches stretched mesh. The actual selection of the size or sizes of mesh within that range was left to the discretion of the contractor. As a guide in selecting the size, he was provided with a summary of the 1955 and 1956 results, as well as those from earlier gill-net experiments of the North Pacific Fisheries Exploration and Gear Research (Powell et al. 1952). The sizes selected were 13 shackles of 7-1/2-, 13 of 8-, and 14 of 8-1/2-inch mesh.

The gill-net catches included 1,617 albacore, representing an average catch of 0.6 fish per shackle with extremes for individual sets of 0 and 5.7 (fig. 2 and table 4). Other species taken in the net are also included in the tabulated data. Their scientific names are given in table 2.

Loss of albacore while hauling the net was small (17 fish or 1.05 percent of the catch). Sharks destroyed 94 fish or 5.8 percent. Some of the destruction occurred during retrieving.

The sizes of albacore taken by gill net from the Paragon (table 9) were determined by measuring the fork length of a 30-40 fish sample from each catch.

Six lines were trolled from the Paragon while enroute to the survey area and eight within the area. The troll catch was 233 albacore. Of these, 212 were taken in the gill-net fishing area, representing a catch rate of 1.1 fish per hour trolled. The trolling results and lengths of troll-caught albacore are given in table 6.

The total albacore catch landed at Seattle, Washington, from the Paragon was 27,053 pounds. Of this, the marketable fish amounted to 24,000 pounds.

Tagging.--Three albacore were tagged on the Smith with Honolulu Biological Laboratory dart tags (Yamashita and Waldron 1958) (table 5).

Food studies.--Albacore stomachs from 2 days' catch of the Smith's gill nets and from all the albacore from the longline and troll catches, except for the three which were tagged, were preserved for laboratory analysis.

Forage organisms.--Observations of the abundance of forage organisms, using a 300-watt light submerged to a depth of 1 meter, were made on the Smith. At least one estimate was made of the relative number and size of the saury and squid under the ship's cargo lights while drifting at each oceanographic and gill-net station. A summary of the data is given in table 10.

Three 20-minute tows were made in the survey area from the Smith using the Isaacs-Kidd midwater trawl (King et al. 1957). The positions are given in table 1. They were made at night with the trawl submerged to approximately the middle of the mixed layer. The catches were negligible, consisting only of a few euphausiids, calanoid copepods, and myctophids.

Although no formal record was kept, night light observations were made from the Paragon with a 100-watt light placed 1 foot outboard and 10 feet above the water. During the gill-net sets the light was turned on for a 30-60 minute period after it had become completely dark. The general absence of organisms under the light was striking with one exception; at station 18 (table 4) a large (1,000-fish) school of saury, Cololabis sp., was observed. The results of daylight observations were similar in that only a few small organisms such as saury, Vellela sp., and pelagic barnacles were sighted.

Observations of bird flocks, fish schools, and aquatic mammals.--The wheel-watch of the Smith made observations of fish schools, birds, and aquatic mammals (table 11). Only one albacore school was sighted during the cruise. It was sighted at 45°08'N., 174°47'W. while the vessel was patrolling a longline set, but no albacore were taken on either the trolling lines or the longline.

Plankton volumes.--Twenty-nine 0-14-m. oblique, two 0-60-m. oblique, and 25 surface plankton tows were made with a 1-meter net of 656 Nitex netting (aperture openings 0.65 mm.) described by King and Demond (1953). An additional seven surface hauls were made with a 45-cm. net of similar construction with 303 Nitex netting (aperture opening 0.30 mm.). Five of these seven tows were made across a temperature front centered at 41°30'N., 175°07'W. The positions and types of tows are listed in table 1 and the plankton volumes are given in table 12.

Measurements of the rate of photosynthetic carbon fixation by use of the radioactive carbon method developed by Steemann Nielsen (1952) and modified by Doty (King et al. 1957), were made aboard the Smith by a staff member of the University of Hawaii. Surface and 20-meter samples were collected at 0800 and 2000 daily throughout the cruise, except for the September 4-9 period, when the 20-meter sample was omitted to avoid loss of time. Three 24-hour series were also run, one just north of the Hawaiian Islands, one at the extreme northern latitude reached on the cruise, and one at the southern extremity of the 175°W. longitude transect. At five of the longline stations, 6-hour in situ experiments were run with bottles at 100-percent, 75-percent, 25-percent, 10-percent, 5-percent, and 1-percent levels of the surface illumination. Samples for chlorophyll analysis were taken along with the 0800 and 2000 samples and the in situ samples. A brief summary of the methods of processing the samples and the results has been provided by M. Oguri of the University of Hawaii and is included as Appendix "A".

Oceanographic Studies

Water sampling.--A total of 51 oceanographic casts (including two at the IGY station off Oahu) were made from the Smith (table 1). Outside the primary albacore survey area, oceanographic observations were limited to the collection of data which would be sufficient to permit comparison of conditions with those observed during previous years. Also, the

observations were planned so that the HBL data would extend and supplement those collected during the same period from vessels of the Seattle Biological Laboratory, which were operating near the Aleutian Islands and in the Bering Sea.

Outside the area the 13-bottle casts to 1,200 meters were made at approximately 90-mile intervals. Inside the albacore survey area the interval was shortened to permit a more detailed study of the geostrophic current structure. Except for the stations occupied on either side of the temperature front centered at 41°31'N., 175°07'W., the interval between stations ranged from 30 to 60 miles. The actual spacing depended to a large extent upon when they could best be worked into the operational schedule.

Samples for salinity, inorganic phosphate, and dissolved oxygen were drawn from each Nansen bottle. Surface salinities and inorganic phosphate samples were also collected at the location of between-station bathythermograph casts. The salinity samples were returned to HBL for analysis, and the dissolved oxygen and inorganic phosphate samples were analyzed aboard ship. The oceanographic station data are given in table 13 and those from the bathythermograph casts in table 14.

Surface salinity samples were taken at most locations of bathythermograph casts from the Paragon. The analyses were made at the Seattle Biological Laboratory. The results are listed in table 15.

Water temperature.--The recording thermograph aboard the Smith was operated continuously. Bathythermograph casts were made before and after each oceanographic cast and each longline set (see table 14 for station data and figs. 4-13 for profiles). On runs between stations, they were made at 30-mile intervals outside the albacore survey area and at intervals of 15 miles or less inside the area. In the latter case the interval was frequently shortened to make the casts coincide with troll catches, Secchi disc lowerings, or C-14 samples. At the front encountered at 41°30'N., 175°07'W., where the temperature increased from 61.5°F. to 63.5°F. in 4 miles along a north-south course, a series of BT casts were made at 1-mile intervals.

Thirty-six bathythermograph casts were made from the Paragon to a depth of 180 feet. All but one were at gill-net stations. The station data are given in table 15.

Meteorological observations.--Synoptic marine weather observations were made on the Smith at 0000, 0600, 1200, and 1800 GCT daily. They were recorded in the International Ship's Weather Code (U.S.W.B. 1954) and transmitted to either the U. S. Weather Bureau at San Francisco, California or Honolulu, Hawaii, whenever radio conditions permitted. The observations are listed in table 16.

Subsurface illumination observations.--Observations of subsurface illumination were made from the Smith with both the Schuler submarine photometer and the Secchi disc. Only the Secchi disc was used from the Paragon. The Schuler photometer and method of operation have been described by Callaway (1957). Lowerings were made once per day until the instrument failed at station 27. The results are listed in table 17.

Secchi disc observations from the Smith were made at approximately local noon each day when the weather permitted. Additional observations were made in the vicinity of the temperature front mentioned above. The results are included in table 1. Secchi disc lowerings from the Paragon were made at the location of bathythermograph casts (table 15).

LABORATORY METHODS AND TECHNIQUES

Most of the procedures used in the analysis of the samples have been described in earlier reports. The dissolved oxygen analyses were made aboard the Smith by the standard Winkler method described in U. S. Navy Hydrographic Office Pub. 607 (1955).

The inorganic phosphate determinations were analyzed by the hydrazine sulphate modification of Denigi's method developed by Van Landingham (King et al. 1957). The determinations for stations 1 to 11 were made with the Automatic Servo-operated Photometer described by Wooster and Rakestraw (1951). After station 11 this instrument failed and a Beckman photometer was used.

The salinity determinations at HBL were made by a modification of Fajan's adsorption indicator method developed by Van Landingham (1957).

The reduction of the protected thermometer readings to true water temperature and the thermometric determination of the sampling depths were done using graphical methods described by La Fond (1951).

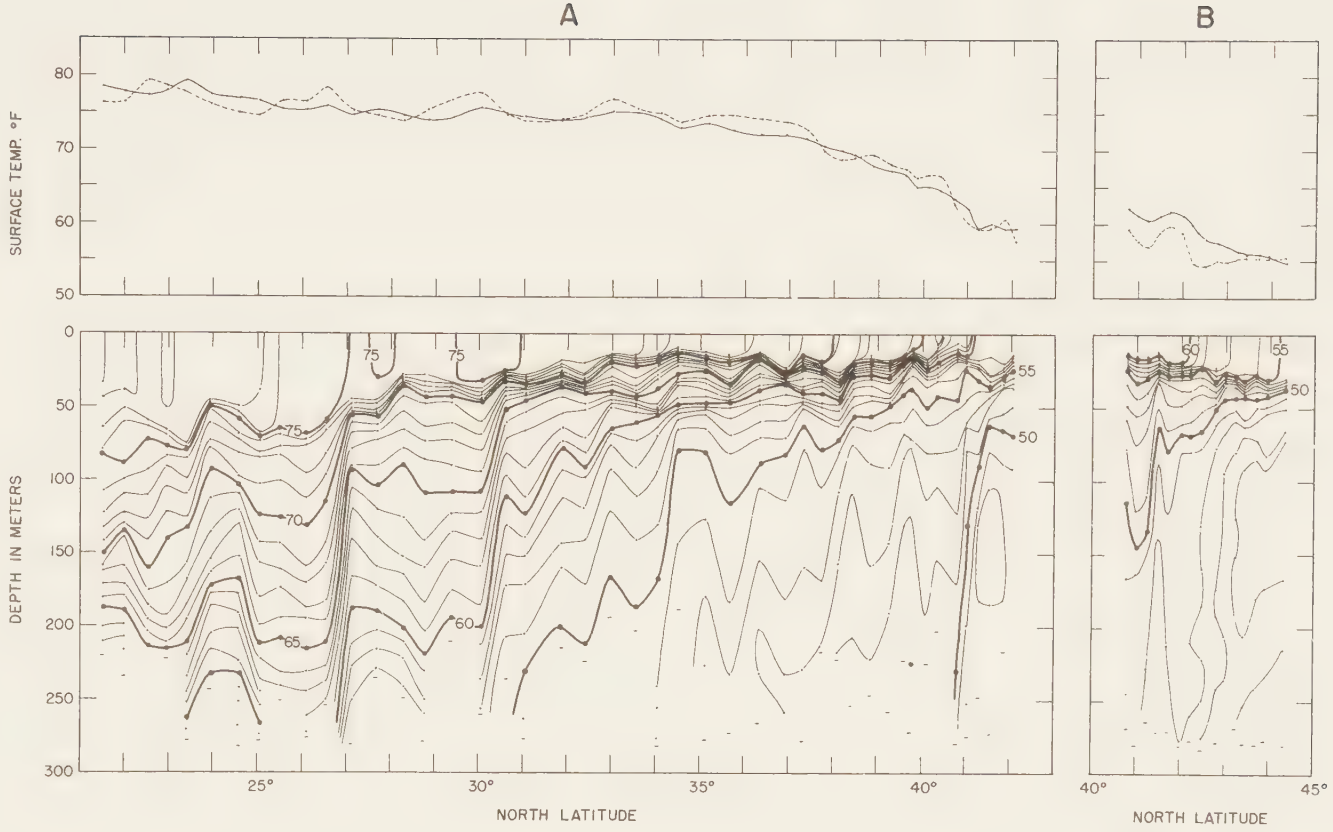


Figure 4.--Surface bucket-temperature (upper panel) and temperature-depth sections from bathythermograph observations (lower panel). Section A (see fig. 1) of Hugh M. Smith cruise 46, July-September 1958.

Figure 5.--Same along Section B (fig. 1).

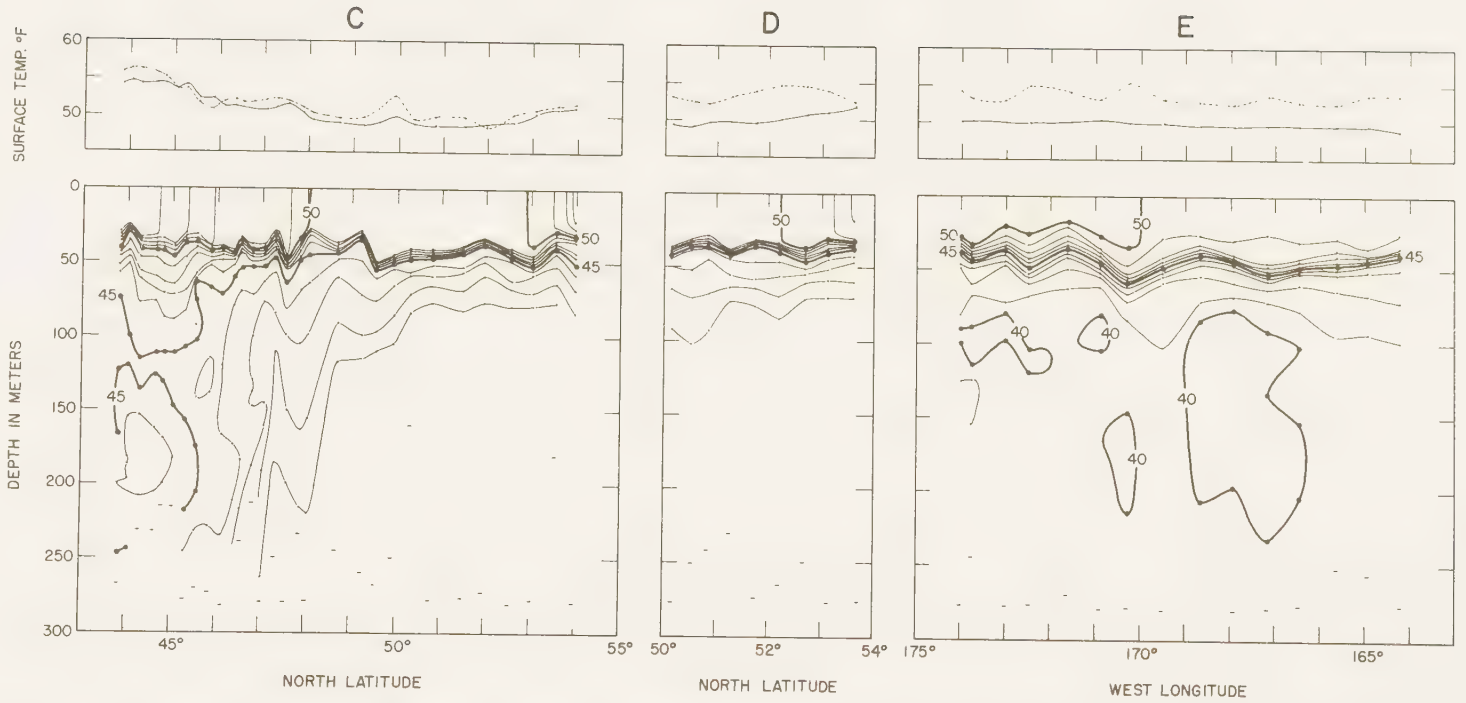


Figure 6.--Surface bucket-temperature (upper panel) and temperature-depth sections from bathythermograph observations (lower panel). Section C (see fig. 1) of Hugh M. Smith cruise 46, July-September 1958.

Figure 7.--Same along Section D (fig. 1).

Figure 8.--Same along Section E (fig. 1).

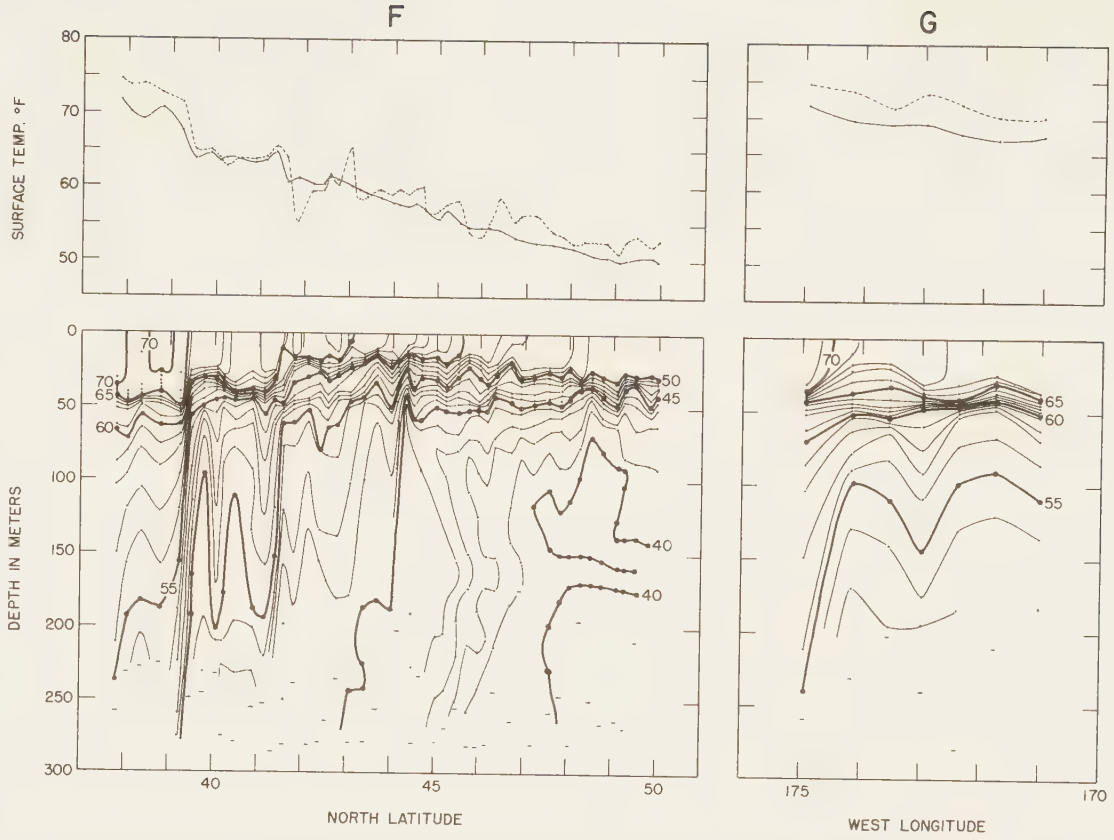


Figure 9.--Surface bucket-temperature (upper panel) and temperature-depth sections from bathythermograph observations (lower panel). Section F (see fig. 1) of Hugh M. Smith cruise 46, July-September 1958.

Figure 10.--Same along Section G (fig. 1).

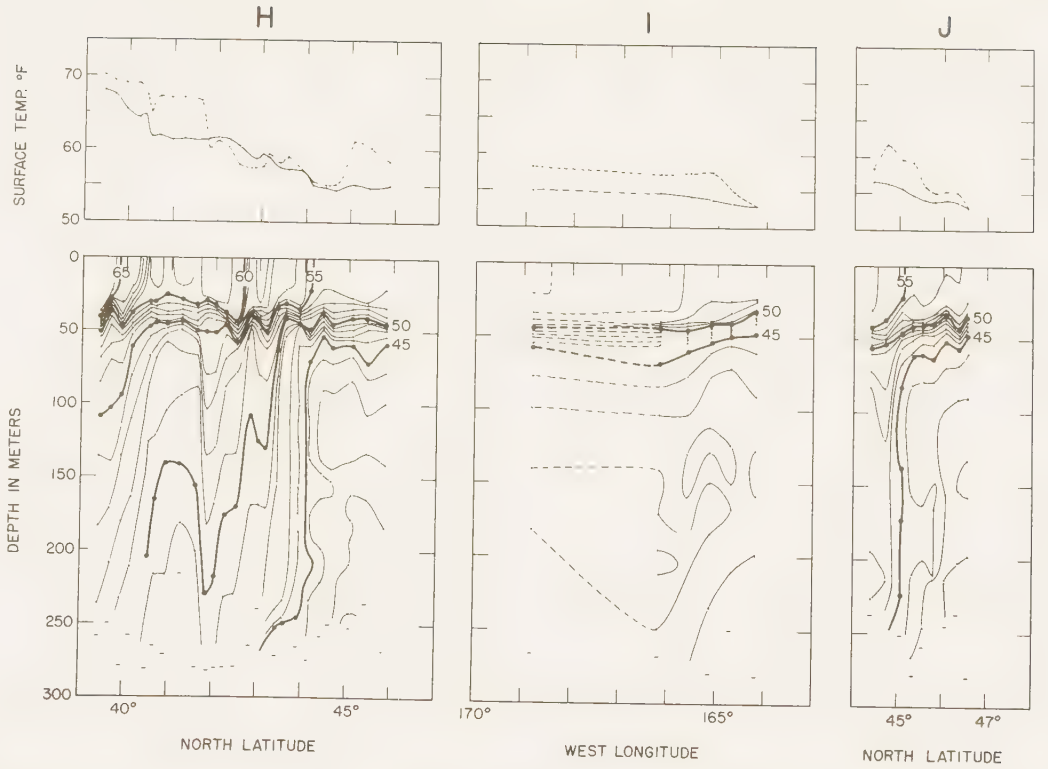


Figure 11.--Surface bucket-temperature (upper panel) and temperature-depth sections from bathythermograph observations (lower panel). Section H (see fig. 1) of Hugh M. Smith cruise 46, July-September 1958.

Figure 12.--Same along Section I (fig. 1).

Figure 13.--Same along Section J (fig. 1).

The processing of the data and the construction of the station curves given in table 13 were prepared using techniques described by Montgomery (1954), Montgomery and Wooster (1954), Stroup (1954), and King et al. (1957).

The zooplankton volumes given in table 12 were obtained by first removing all organisms over 5 cm. in length and all non-food organisms (King and Hida 1954) over 2 cm. in length and then measuring the wet, drained volume in the manner described by King and Demond (1953).

FUTURE PUBLICATION

It is expected that the data from Smith cruise 46 and the Paragon will be used as the basis for at least two future reports and parts of the data will be incorporated in other biological reports. A report discussing the commercial potentialities of the area is now being prepared by the authors of this report, and a report comparing the oceanographic conditions with those during the summer of 1955 (McGary et al. 1956) is contemplated. The results of the albacore stomach analyses will be used in a general study of the food of the albacore and the plankton data in oceanwide indicator organism studies.

PERSONNEL

Hugh M. Smith

Barnes Collinson, Master
James W. McGary, Field Party Chief
Everet C. Jones, Fishery Research Biologist
Reginald M. Gooding, Fishery Research Biologist
Donald A. Thomson, Fishery Research Biologist
Fred Hertlein III, Physical Science Aid
Robert K. S. Lee, Research Assistant, University of Hawaii

M/V Paragon

Harry J. Jacobsen, Master
Joseph J. Graham, Fishery Research Biologist

Personnel processing samples and data (in addition to field parties)

Mary Lynne Godfrey, Physical Science Technician (Oceanography)
John W. Van Landingham, Physical Science Technician (Chemistry)
Ella W. Mendiola, Physical Science Technician (Oceanography)
Betty Ann L. Keala, Statistical Clerk

RECORDS

The following records were kept and are on file at the Honolulu Biological Laboratory, except as otherwise noted:

Hugh M. Smith

Barograph records (at U. S. Weather Bureau Records Center, Asheville, N. C.)
Chemical log sheets
Deck log
Gill net log
Log sheet "A" (original oceanographic data)
Log sheet "B" (bathythermograph data, original at Scripps Institution of Oceanography, duplicate at Honolulu Biological Laboratory)
Longline log
Midwater trawl log
Occurrence of tuna schools, birds, and aquatic mammals
Photometer log
Plankton log and flowmeter calibration log
Scientists' log
Tagging record
Thermograph charts
Track chart
Trolling log
U. S. Weather Bureau Form 1210F (original at U. S. Weather Bureau Records Center, Asheville, N. C., duplicate at Honolulu Biological Laboratory)

M/V Paragon

Deck log
Gill net log
Log sheet "B" (bathythermograph data, original at Scripps Institution of Oceanography, duplicate at Honolulu Biological Laboratory)
Salinity records (original at Bureau of Commercial Fisheries Biological Laboratory, Seattle, Washington)
Scientists' log
Trolling log

LITERATURE CITED

CALLAWAY, RICHARD J.
1957. Oceanographic and meteorological observations in the northeast and central North Pacific, July-December 1956. U. S. Fish and Wildlife Service, Special Scientific Report--Fisheries 230, 49 p.

GRAHAM, JOSEPH J.
1957. Central North Pacific albacore surveys, May to November 1955. U. S. Fish and Wildlife Service, Special Scientific Report--Fisheries 212, 38 p.

GRAHAM, JOSEPH J. and HERBERT J. MANN
1959. Construction and catch selectivity of albacore gill net used in the central North Pacific. U. S. Fish and Wildlife Service, Commercial Fisheries Review 21(8): 1-6.

KING, JOSEPH E., T. S. AUSTIN, and M. S. DOTY
1957. Preliminary report on expedition EASTROPIC. U. S. Fish and Wildlife Service, Special Scientific Report--Fisheries 201, 155 p.

KING, JOSEPH E. and JOAN DEMOND
1953. Zooplankton abundance in the central Pacific. U. S. Fish and Wildlife Service, Fishery Bulletin 54(82): 111-144.

KING, JOSEPH E. and T. S. HIDA
1954. Variations in zooplankton abundance in Hawaiian waters, 1950-52. U. S. Fish and Wildlife Service, Special Scientific Report--Fisheries 118, 66 p.

LA FOND, EUGENE C.
1951. Processing oceanographic data. U. S. Navy Hydrographic Office Publication 614, 114 p.

MC GARY, JAMES W., E. C. JONES, and T. S. AUSTIN
1956. Mid-Pacific oceanography, Part IX Operation NORPAC. U. S. Fish and Wildlife Service, Special Scientific Report--Fisheries 168, 127 p.

MONTGOMERY, RAYMOND B.
1954. Analysis of a Hugh M. Smith oceanographic section from Honolulu southward across the Equator. Journal of Marine Research 13(1): 67-75.

MONTGOMERY, RAYMOND B. and W. S. WOOSTER
1954. Thermosteric anomaly and the analysis of serial oceanographic data. Deep Sea Research 2(1): 63-70.

POWELL, DONALD E., D. L. ALVERSON, and R. LIVINGSTON, JR.
1952. North Pacific albacore tuna exploration--1950. U. S. Fish and Wildlife Service, Fishery Leaflet 402, 56 p.

SHOMURA, RICHARD S. and T. OTSU
1956. Central North Pacific albacore surveys, January 1954-February 1955. U. S. Fish and Wildlife Service, Special Scientific Report--Fisheries 173, 29 p.

STEEMANN NIELSEN, E.
1952. The use of radio-active carbon (C-14) for measuring organic production in the sea. Journal du Conseil 18(2): 117-140.

STROUP, EDWARD D.
1954. Mid-Pacific oceanography, Part IV. Transequatorial waters, January-March 1952. U. S. Fish and Wildlife Service, Special Scientific Report--Fisheries 135, 52 p.

U. S. NAVY HYDROGRAPHIC OFFICE
1955. Instruction manual for oceanographic observations. 2nd edition. U. S. Navy Hydrographic Office Publication 607, 210 p.

1956. Bathythermograph observations. 2nd edition. U. S. Navy Hydrographic Office Publication 606-c, 16 p.

U. S. WEATHER BUREAU
1954. Manual of marine meteorological observations. 9th edition. U. S. Weather Bureau Circular M, 104 p.

VAN LANDINGHAM, JOHN W.
1957. A modification of the Knudsen method for salinity determination. Journal du Conseil 22(2): 174-179.

WOOSTER, WARREN S. and N. W. RAKESTRAW
1951. The estimation of dissolved phosphate in sea water. Journal of Marine Research 10(1): 91-100.

YAMASHITA, DANIEL T. and K. D. WALDRON
1958. An all-plastic dart-type fish tag. California Fish and Game 44(4): 311-317.

Table 1.--Summary of the types of observations (except C_{14}) made at Hugh M. Smith cruise 46 stations

Abbreviations used:

SD - Secchi disc
GN - Gill net
LL - Longline
MWT - Isaacs-Kidd midwater trawl
NL - Night light
Plk - Plankton tow

Sta. No.	Time GCT	Date 1958	Lat. N.	Long. W.	Hydro cast (m.)	SD (m.)	Photo-meter	GN	LL	60 m. Plk	140 m. Plk	Surf Plk 1 m.	Surf Plk 45 cm.	MWT	NL
1	0538	7/22	21°11'	158°19'	1400	-	-	-	-	-	-	-	-	-	-
2	0850	7/22	21°11'	158°19'	-	-	-	-	-	2	-	-	-	-	-
3	1238	7/22	21°11'	158°19'	500	-	-	-	-	-	-	-	-	-	-
4	0652	7/23	23°56'	158°33'	1200	-	-	-	-	-	x	x	-	-	-
5	1847	7/23	25°33'	158°34'	1200	-	-	-	-	-	-	-	-	-	-
6	2230	7/23	26°07'	158°38'	-	25	x	-	-	-	-	-	-	-	-
7	0613	7/24	27°08'	158°38'	1200	-	-	-	-	-	x	x	-	-	-
8	1831	7/24	28°45'	158°44'	1200	-	-	-	-	-	-	-	-	-	-
9	2245	7/24	29°29'	158°51'	-	35	x	-	-	-	-	-	-	-	-
10	0642	7/25	30°36'	158°56'	1200	-	-	-	-	-	x	x	-	-	-
11	1940	7/25	32°25'	158°50'	1200	-	-	-	-	-	-	-	-	-	-
12	2355	7/25	33°05'	158°50'	-	31	x	-	-	-	-	-	-	-	-
13	0726	7/26	34°01'	158°54'	1200	-	-	-	-	-	x	-	-	-	x
14	1939	7/26	35°44'	158°58'	1200	-	-	-	-	-	-	-	-	-	-
15	0000	7/27	36°24'	159°01'	-	18	x	-	-	-	-	-	-	-	-
16	0749	7/27	37°25'	159°09'	1200	-	-	-	-	-	x	x	-	-	x
17	1936	7/27	38°35'	159°13'	1200	-	-	-	-	-	-	-	-	-	-
18	0000	7/28	39°00'	159°14'	-	13	x	-	-	-	-	-	-	-	-
19	0735	7/28	39°40'	159°15'	1200	-	-	-	-	-	x	x	-	x	x
20	1915	7/28	40°11'	159°18'	-	15	x	-	-	-	-	-	-	-	-
21	2330	7/28	40°31'	159°18'	-	17	x	-	-	-	-	-	-	-	-
22	0535	7/29	40°49'	159°38'	1200	-	-	x	-	-	x	x	-	-	x
	1810	7/29	40°48'	159°39'	-	-	-	-	-	-	-	-	-	-	-
23	2100	7/29	41°05'	159°39'	-	17	x	-	-	-	-	-	-	-	-
24	2345	7/29	41°18'	159°39'	-	18	x	-	-	-	-	-	-	-	-
25	0300	7/30	41°30'	159°39'	-	18	x	-	-	-	-	-	-	-	-
26	0600	7/30	41°20'	159°56'	1200	-	-	x	-	-	x	x	-	x	x
	1645	7/30	41°20'	159°59'	-	-	-	-	-	-	-	-	-	-	-
27	1930	7/30	41°37'	159°58'	-	13	x	-	-	-	-	-	-	-	-
28	2330	7/30	42°03'	159°57'	-	16	x	-	-	-	-	-	-	-	-
29	0600	7/31	41°46'	159°24'	1200	-	-	x	-	-	x	x	-	-	x
	1700	7/31	41°44'	159°22'	-	-	-	-	-	-	-	-	-	-	-
30	1930	7/31	41°32'	159°04'	-	14	-	-	-	-	-	-	-	-	-
31	2330	7/31	41°13'	158°42'	-	14	-	-	-	-	-	-	-	-	-
32	0330	8/1	40°59'	158°27'	-	14	-	-	-	-	-	-	-	-	-
33	0555	8/1	41°09'	158°24'	1200	-	-	x	-	-	x	x	-	-	x
	1720	8/1	41°06'	158°22'	-	-	-	-	-	-	-	-	-	-	-
34	1930	8/1	41°22'	158°22'	-	13	-	-	-	-	-	-	-	-	-
35	0020	8/2	41°48'	158°22'	-	15	-	-	-	-	-	-	-	-	-
36	0315	8/2	42°04'	158°22'	-	15	-	-	-	-	-	-	-	-	-
37	0545	8/2	42°19'	158°22'	1200	-	-	x	-	-	x	x	-	-	x
	1730	8/2	42°20'	158°23'	-	-	-	-	-	-	-	-	-	-	-
38	1915	8/2	42°32'	158°26'	-	14	-	-	-	-	-	-	x	-	-
39	2330	8/2	43°02'	158°32'	-	16	-	-	-	-	-	-	-	-	-
40	0555	8/3	43°10'	158°47'	1200	-	-	x	-	-	x	x	-	-	x
	1740	8/3	43°12'	158°44'	-	-	-	-	-	-	-	-	-	-	-
41	0533	8/4	41°16'	158°57'	1200	-	-	-	-	-	-	-	-	-	-
42	1944	8/4	43°49'	159°55'	1200	-	-	-	-	-	-	-	-	-	-
43	0735	8/5	45°00'	159°23'	1200	-	-	-	-	-	-	-	-	-	-
44	1734	8/5	46°06'	159°40'	1200	-	-	-	-	-	-	-	-	-	-
45	0140	8/6	47°04'	159°44'	1200	12	-	-	-	-	-	-	-	-	-
46	0956	8/6	48°04'	159°42'	1200	-	-	-	-	-	x	x	-	-	-
47	2159	8/6	49°35'	159°45'	1200	16	-	-	-	-	-	-	-	-	-

Table 1.--Summary of the types of observations (except C_{14}) made at Hugh M. Smith cruise 46 stations (cont'd)

Sta. No.	Time GCT	Date 1958	Lat. N.	Long. W.	Hydro cast (m.)	SD (m.)	Photo-meter	GN	LL	60 m. Plk	140 m. Plk	Surf Plk 1 m.	Surf Plk 45 cm.	MWT	NL
48	0755	8/7	50°56'	159°48'	1200	-	-	-	-	-	x	x	-	-	-
49	2016	8/7	52°35'	159°56'	1200	13	-	-	-	-	-	-	-	-	-
50	0654	8/8	54°00'	159°55'	1200	-	-	-	-	-	x	x	-	-	x
51	1944	8/11	50°00'	174°03'	1200	-	-	-	-	-	-	-	-	-	-
52	0495	8/12	49°02'	174°36'	1200	14	-	-	-	-	-	-	-	-	-
53	1127	8/12	48°03'	174°45'	1200	-	-	-	-	-	x	x	-	-	-
54	1936	8/12	47°14'	174°56'	1200	17	-	-	-	-	-	-	-	-	-
55	0030	8/13	46°42'	174°59'	-	16	-	-	-	-	-	-	-	-	-
56	0555	8/13	46°12'	174°56'	1200	-	-	x	-	-	x	x	-	x	x
	1640	8/13	46°10'	174°56'	-	-	-	-	-	-	-	-	-	-	-
57	1915	8/13	46°01'	174°56'	-	17	-	-	-	-	-	-	-	-	-
58	2340	8/13	45°30'	174°56'	-	15	-	-	-	-	-	-	-	-	-
59	0430	8/14	45°04'	174°54'	-	17	-	-	-	-	-	-	-	-	-
60	0604	8/14	45°12'	174°53'	1200	-	-	x	-	-	x	-	-	-	x
	1900	8/14	-	-	-	18	-	-	-	-	-	-	-	-	-
	2345	8/14	-	-	-	17	-	-	-	-	-	-	-	-	-
	0130	8/15	45°08'	174°47'	-	-	-	-	x	-	-	-	-	-	-
61	0635	8/15	44°39'	174°48'	-	-	-	-	-	-	-	-	-	-	-
	1745	8/15	44°31'	174°39'	-	-	-	x	-	-	-	-	-	-	x
62	1937	8/15	44°23'	174°40'	1200	-	-	-	-	-	-	-	-	-	-
63	0554	8/16	43°29'	174°48'	1200	-	-	x	-	-	x	x	-	-	x
	2015	8/16	-	-	-	14	-	-	-	-	-	-	-	-	-
	0320	8/17	43°23'	174°38'	-	13	-	-	x	-	-	-	-	-	-
64	0535	8/17	43°22'	174°43'	-	-	-	x	-	-	-	-	-	-	x
	1745	8/17	43°28'	174°40'	-	-	-	-	-	-	-	-	-	-	-
65	1910	8/17	43°20'	174°45'	-	13	-	-	-	-	-	-	-	-	-
66	0000	8/18	42°50'	175°02'	-	13	-	-	-	-	-	-	-	-	-
67	0529	8/18	42°47'	175°08'	1200	-	-	x	-	-	x	-	-	-	x
	1945	8/18	42°46'	175°08'	-	14	-	-	-	-	-	-	-	-	-
	0120	8/19	42°46'	175°08'	-	14	-	-	-	-	-	-	-	-	-
	0520	8/19	42°48'	175°03'	-	-	-	-	x	-	-	-	-	-	-
68	0617	8/19	42°48'	175°03'	-	-	-	x	-	-	-	x	-	-	x
	1815	8/19	42°42'	175°11'	-	-	-	-	-	-	-	-	-	-	-
69	0556	8/20	41°35'	175°08'	1200	-	-	-	-	-	x	x	-	-	x
70	1730	8/20	41°28'	175°06'	-	-	-	-	x	-	-	-	-	-	-
	1920	8/20	41°32'	175°08'	-	16	-	-	-	-	-	-	-	-	-
	2010	8/20	-	-	-	14	-	-	-	-	-	-	-	-	-
	2020	8/20	-	-	-	16	-	-	-	-	-	-	-	-	-
	2035	8/20	-	-	-	16	-	-	-	-	-	-	-	-	-
	2045	8/20	-	-	-	17	-	-	-	-	-	-	-	-	-
	2055	8/20	-	-	-	18	-	-	-	-	-	-	-	-	-
	2105	8/20	-	-	-	19	-	-	-	-	-	-	-	-	-
	2300	8/20	-	-	-	-	-	-	-	-	-	-	(5)	-	-
	0300	8/21	41°28'	175°06'	-	-	-	-	-	-	-	-	-	-	-
71	2236	8/22	41°33'	175°02'	1200	17	-	-	-	-	-	-	-	-	-
72	0030	8/23	41°39'	175°06'	-	13	-	-	-	-	-	-	-	-	-
73	0120	8/23	41°43'	175°09'	-	11	-	-	-	-	-	-	-	-	-
74	0342	8/23	41°52'	175°16'	1200	16	-	-	-	-	-	-	x	-	-
75	0540	8/23	41°52'	175°16'	-	-	-	-	-	-	x	-	-	-	-
76	0655	8/23	41°35'	175°01'	-	-	-	x	-	-	-	-	-	-	x
	1745	8/23	41°35'	175°09'	-	-	-	-	-	-	-	-	-	-	-
77	1920	8/23	41°28'	175°10'	-	15	-	-	-	-	-	-	-	-	-
78	0000	8/24	40°56'	175°10'	-	16	-	-	-	-	-	-	-	-	-
79	0436	8/24	40°29'	175°11'	1200	-	-	-	-	-	-	-	-	-	-
80	1547	8/24	39°14'	175°10'	1200	-	-	-	-	-	-	-	-	-	-
81	1900	8/24	38°52'	175°06'	-	18	-	-	-	-	-	-	-	-	-
82	0102	8/25	37°58'	174°58'	1200	18	-	-	-	-	-	-	-	-	-

Table 1.--Summary of the types of observations (except C 14) made at Hugh M. Smith cruise 46 stations (cont'd)

Sta. No.	Time GCT	Date 1958	Lat. N.	Long. W.	Hydro cast (m.)	SD (m.)	Photo-meter	GN	LL	60 m. Plk	140 m. Plk	Surf Plk 1 m.	Surf Plk 45 cm.	MWT	NL
83	2154	8/25	39°25'	170°58'	1200	18	-	-	-	-	-	-	-	-	-
84	0130	8/26	39°59'	170°50'	-	16	-	-	-	-	-	-	-	-	-
85	0555	8/26	39°50'	170°52'	-	-	-	x	-	-	x	x	-	-	x
	1700	8/26	39°51'	170°46'	-	-	-	-	-	-	-	-	-	-	-
86	1925	8/26	40°04'	170°41'	-	17	-	-	-	-	-	-	-	-	-
87	2320	8/26	40°28'	170°32'	1200	15	-	-	-	-	-	-	-	-	-
88	0550	8/27	40°15'	170°16'	-	-	-	x	-	-	x	x	-	-	x
	1915	8/27	40°13'	170°20'	-	23	-	-	-	-	-	-	-	-	-
	0130	8/28	-	-	-	23	-	-	-	-	-	-	-	-	-
	0320	8/28	40°13'	170°20'	-	-	-	-	x	-	-	-	-	-	-
89	2016	8/28	41°26'	170°39'	1200	18	-	-	-	-	-	-	-	-	-
90	0538	8/29	42°21'	170°12'	1200	-	-	x	-	-	x	x	-	-	x
	2010	8/29	-	-	-	17	-	-	-	-	-	-	-	-	-
	2300	8/29	42°13'	170°11'	-	16	-	-	-	-	-	-	-	-	-
	0335	8/30	42°17'	170°11'	-	-	-	-	x	-	-	-	-	-	-
91	0700	8/30	42°50'	169°57'	-	-	-	x	-	-	x	x	-	-	x
	1735	8/30	42°46'	170°03'	-	-	-	-	-	-	-	-	-	-	-
92	1800	8/30	42°56'	169°55'	-	20	-	-	-	-	-	-	-	-	-
93	2336	8/30	43°18'	169°39'	1200	18	-	-	-	-	-	-	-	-	-
94	0510	8/31	43°56'	169°30'	-	-	-	-	-	-	x	x	-	-	-
95	0740	8/31	44°06'	169°20'	1200	-	-	-	-	-	-	-	-	-	-
96	0534	9/1	45°46'	168°46'	1200	-	-	-	-	-	x	x	-	-	x
97	1900	9/1	45°57'	166°16'	-	11	-	-	-	-	-	-	-	-	-
98	0420	9/2	46°34'	164°44'	1200	-	-	-	-	-	x	-	-	-	x
	1930	9/2	-	-	-	17	-	-	-	-	-	-	-	-	-
	0014	9/3	46°28'	164°29'	-	15	-	-	-	-	-	-	-	-	-
	0215	9/3	46°33'	164°30'	-	-	-	-	x	-	-	-	-	-	-
99	0813	9/3	45°38'	164°47'	1200	-	-	-	-	-	-	-	-	-	x
100	1925	9/3	44°58'	165°04'	-	13	-	-	-	-	-	-	-	-	-
101	2210	9/3	44°43'	165°04'	1200	-	-	-	-	-	-	-	-	-	-

Table 2.--List of common and scientific names and abbreviations used in HBL data for fish encountered during cruise 46 of the Hugh M. Smith and that of the M/V Paragon

ABBREVIATION	COMMON NAME	SCIENTIFIC NAME
AL	Albacore tuna	Thunnus germo (Lacépède)
-	Boar fish	Histiopteridae
-	Broadbill swordfish	Xiphias gladius Linnaeus
DO	Dolphin	Coryphaena hippurus Linnaeus
GB	Great blue shark	Prionace glauca (Linnaeus)
LF	Lancet fish	Alepisaurus borealis(Gill)
-	Lantern fish	Myctophidae
MS	Mackerel shark	Lamna ditropis Hubbs and Follett
MKS	Mako shark	Isurus glaucus Muller and Henle
-	Pomfret	Brama raii (Bloch)
SJ	Skipjack	Katsuwonus pelamis (Linnaeus)
-	Saury	Cololabis sp.
WA	Wahoo	Acanthocybium solandri (Cuvier and Valenciennes)

Table 3.--Summary of gill-net catches, Hugh M. Smith cruise 46

Sta. No.	Date, 1958 (GCT)	Lat. N.	Long. W.	Surf. Temp. 1/ (°F.) S	Surf. Temp. 1/ (°F.) F	AL	Sharks	Misc.	Remarks
22	7/29	40°49'	159°38'	63.1	63.3	0	41 GB	0	
26	7/30	41°20'	159°59'	61.7	61.5	0	4 GB	0	
29	7/31	41°46'	159°24'	58.8	58.6	0	11 GB	2 squid	
33	8/1	41°09'	158°24'	61.4	61.5	4	38 GB	0	
37	8/2	42°20'	158°23'	59.8	59.2	0	6 GB	0	
40	8/3	43°10'	158°47'	56.7	56.4	5	1 MS 1 GB 1 MS 1 Basking	4 Bramids 1 Boar fish 3 squid	1 Alb. lost
56	8/13	46°12'	174°56'	54.7	54.4	0	0	11 Bramids	1 Alb. lost
60	8/14	45°12'	174°53'	56.2	55.9	3	1 GB 2 MS	26 Bramids 1 squid	1 Alb. lost
61	8/15	44°31'	174°39'	57.8	57.1	0	10 GB	1 Bramid 1 squid	(net badly tangled because of seas)
63	8/16	43°29'	174°48'	59.0	58.9	26	1 MS 18 GB	1 Bramid 2 squid	1 Alb. lost
64	8/17	43°22'	174°43'	58.8	58.8	3	7 GB	1 Bramid 2 squid	
67	8/18	42°47'	175°08'	61.0	60.8	49	22 GB 1 MS	3 Bramid 3 squid 1 porpoise	
68	8/19	42°48'	175°03'	61.4	60.8	7	8 MS 1 MS	0	(right whale) 2 Bramids lost
76	8/23	41°35'	175°09'	61.9	61.2	0	0	0	
85	8/26	39°50'	170°52'	65.7	65.3	0	0	7 SJ 2 squid	1 SJ lost
86	8/27	40°15'	170°16'	63.2	62.8	0	0	13 SJ 1 Brd. bill swordfish	
90	8/29	42°21'	170°12'	61.1	60.5	0	5 GB	0	
91	8/30	42°50'	169°57'	58.7	58.7	0	14 GB	2 Bramids	
98	9/2	46°34'	164°44'	53.3	53.0	0	0	17 Bramids 2 Fur seals	1 Bramid lost
Total 19						97		20 SJ	4 Alb. lost 1 SJ lost

1/ S indicates start, F indicates finish of fishing.

Table 4.--Summary of gill-net catches, M/V Paragon

Sta. No.	Date, 1958	Position		Surf. Temp. (°F.)	Albacore	GB	Miscellaneous
		Latitude N.	Longitude W.				
1	7/26	41°40'	157°11'	62.7	145	158	--
2	7/27	41°44'	156°58'	61.9	133	144	4 broadbill swordfish
3	7/28	42°20'	156°49'	60.3	119	165	--
4	7/29	41°49'	157°09'	61.8	40	123	--
5	7/30	41°43'	157°03'	62.0	30	156	--
6	7/31	41°38'	157°20'	62.0	13	116	--
7	8/1	42°31'	157°08'	57.7	22	18	--
8	8/2	42°56'	158°13'	57.4	20	--	1 un. tuna 4 porpoise
9	8/4	41°16'	161°24'	60.8	1	27	2 un. tuna
10	8/5	41°36'	162°40'	60.2	3	17	2 broadbill 1 porpoise
11	8/6	41°27'	163°37'	61.4	0	53	--
12	8/7	42°12'	163°30'	58.9	24	19	several boarfish 2 bramids
13	8/8	42°11'	162°10'	59.2	14	22	2 broadbill
14	8/9	42°15'	160°51'	59.4	22	16	3 un. tuna 2 broadbill
15	8/10	41°57'	159°12'	58.5	103	72	1 un. tuna
16	8/12	42°06'	159°22'	57.7	18	31	1 porpoise
17	8/13	41°50'	159°23'	58.7	41	214	--
18	8/14	42°02'	158°57'	59.7	62	--	2 un. tuna 1 broadbill
19	8/15	42°24'	158°38'	58.7	72	1	--
20	8/16	42°24'	158°35'	58.8	60	42	--
21	8/17	42°34'	158°27'	58.3	19	--	--
22	8/20	42°26'	158°16'	58.7	45	61	2 un. tuna
23	8/22	42°30'	157°56'	58.7	12	112	1 broadbill
24	8/23	42°02'	159°05'	57.5	5	90	1 un. tuna 2 broadbill
25	8/24	42°06'	158°45'	59.5	46	123	1 porpoise
26	8/25	41°38'	158°25'	59.9	28	8	--
27	8/26	41°43'	157°22'	63.0	183	18	2 broadbill
28	8/27	41°45'	157°09'	64.0	227	40	--
29	8/28	41°48'	156°52'	63.5	55	30	--
30	8/29	41°46'	157°09'	62.7	54	22	--
			TOTAL		1,617	1,897	

Table 5.--Summary of surface trolling, Hugh M. Smith, cruise 46

Date, 1958	Within Positions				Hours Trolled	Lines	Catch	Fork length (cm.)	Ident. lost fish	AL tagged	Speed (knots)
	Lat. N.	Long. W.	Lat. N.	Long. W.							
7/22	21°34'	158°25'	23°55'	158°33'	14.5	2	--	--	--	--	9.3
7/23	25°03'	158°32'	27°07'	158°38'	12.5	2	1 WA	145.0	--	--	9.3
7/24	28°17'	158°40'	30°36'	158°56'	12.0	2	--	--	--	--	9.0
7/25	31°53'	158°52'	34°01'	158°54'	12.0	2	--	--	1 DO	--	9.5
7/26	35°12'	158°57'	37°24'	159°08'	12.0	2	1 DO	91.7	--	--	9.5
7/27	38°15'	159°12'	39°40'	159°15'	13.0	5	--	--	--	--	6.5
7/28	39°49'	159°18'	40°49'	159°31'	15.0	5	--	--	--	--	6.0
7/29	40°48'	159°39'	41°20'	159°56'	11.0	5	1 AL	--	--	1	6.0
7/30	41°21'	159°59'	41°46'	159°24'	12.0	5	1 AL	72.6	--	1	6.0
7/31	41°45'	159°23'	41°09'	158°24'	12.5	5	--	--	--	--	6.0
8/1	41°06'	158°22'	42°19'	158°22'	12.0	5	1 AL	85.0	--	1	6.0
8/2	42°21'	158°23'	43°10'	158°46'	12.0	5	1 AL	67.5	--	--	6.0
8/3	43°12'	158°44'	44°16'	158°57'	11.5	5	--	--	--	--	6.0
8/4	43°54'	159°38'	45°00'	159°23'	14.5	5	--	--	--	--	6.0
8/5	46°07'	159°40'	47°49'	159°42'	12.0	3	--	--	--	--	9.0
8/7	52°36'	159°56'	54°00'	159°55'	9.0	3	--	--	--	--	9.0
8/9	50°14'	164°26'	50°07'	166°24'	9.0	3	--	--	--	--	9.0
8/12	47°33'	174°53'	46°12'	174°56'	10.5	5	--	--	--	--	6.0
8/13	46°10'	174°56'	45°11'	174°54'	11.0	5	--	--	--	--	6.0
8/14	45°08'	174°47'	44°39'	174°44'	7.0	5	--	--	--	--	6.0
8/15	44°29'	174°39'	43°44'	174°47'	9.0	4	--	--	1 AL	--	6.0
8/16	43°22'	174°44'	43°22'	174°43'	3.5	5	--	--	--	--	5.0
8/17	43°28'	174°40'	42°47'	175°07'	11.0	5	3 AL	68.0 72.2 71.2	--	--	6.0
8/18	42°46'	175°08'	42°46'	175°08'	3.0	5	--	--	--	--	6.0
8/19	42°41'	175°11'	41°35'	175°08'	10.5	4	--	--	--	--	6.0
8/20	41°32'	175°08'	41°19'	175°06'	4.0	5	1 AL	87.0	--	--	6.0
8/21	41°30'	174°59'	41°50'	174°56'	10.0	5	--	--	--	--	6.0
8/22	41°47'	175°01'	41°52'	175°16'	7.0	6	--	--	--	--	6.0
8/23	41°35'	175°09'	40°30'	175°11'	9.5	5	1 MKS	--	--	--	6.0
8/24	39°13'	179°10'	38°21'	173°57'	13.0	2	--	--	--	--	9.0
8/25	39°16'	171°44'	39°50'	170°52'	10.5	5	--	--	--	--	9.0
8/26	39°53'	170°46'	40°15'	170°17'	9.5	5	--	--	--	--	6.5
8/27	40°15'	170°19'	40°47'	170°18'	6.0	2	--	--	--	--	6.0
8/28	41°26'	170°39'	42°21'	170°12'	8.0	5	4 AL	68.4 90.6 83.9 73.2	--	--	6.0
8/30	42°45'	170°03'	43°56'	169°30'	10.0	5	--	--	--	--	6.0
8/31	44°39'	168°33'	45°31'	168°45'	8.0	3	--	--	--	--	6.0
9/1	45°58'	166°37'	46°34'	164°44'	10.0	5	--	--	--	--	9.0
9/2	46°28'	164°29'	46°05'	164°31'	5.5	3	--	--	--	--	6.5
9/3	45°02'	165°06'	44°18'	164°32'	11.0	3	1 AL	63.9	--	--	6.0
9/4	41°25'	163°43'	40°48'	163°39'	3.5	2	--	--	--	--	10.0
9/5	38°35'	163°22'	36°27'	162°50'	12.0	3	2 DO	84.0 84.0	--	--	10.0
9/6	34°49'	162°12'	33°04'	161°33'	11.0	2	--	--	--	--	10.0
9/7	31°03'	160°48'	29°12'	160°23'	11.0	2	1 DO	78.8	--	--	10.0
9/8	27°03'	158°43'	25°22'	159°08'	11.0	2	1 DO	65.5	--	--	9.5

Table 6.--Summary of surface trolling catches, M/V Paragon

Date, 1958	Estimated position of catch		Hours trolled	Lines trolled	AL catch	Fork lengths (cm.)
	N. Lat.	W. Long.				
7/20	47°48'	138°53'	12.0	4	1	68.4
7/23	46°39'	153°07'	15.0	4	1	65.3
7/24	44°45'	155°35'	11.0	4	2	67.7, 70.2
7/25	43°42'	157°09'	14.5	5	3	70.0,67.7, 67.0
7/26	41°37'	157°07'	13.5	6	6	78.9, 76.9, 80.2, 69.4, 70.5, 53.6
7/28	41°53'	156°56'	7.0	8	38	67.2, 71.6, 68.8, 64.2, 66.6, 53.5, 55.7, 66.5. 69.2, 67.8, 61.4, 52.3, 55.5, 55.5, 53.4, 53.5; 10 AL 50-60 (est.), 12 AL 60-70 (est.)
7/30	41°43'	157°05'	5.0	8	37	52.5, 54.5, 64.5, 66.8, 67.1, 68.1, 68.5, 68.8, 68.9, 68.9, 69.3, 69.5, 69.7, 69.8, 71.3, 72.3, 72.8, 77.6, 83.4, 92.0; 17 not measured
7/31	41°43'	157°03'	4.0	8	4	66.5, 67.7, 69.3, 63.8
8/4	41°29'	159°52'	10.5	6	6	51.7, 52.5, 69.7, 80.3, 73.3, 78.2
8/7	41°45'	163°38	7.0	6	2	69.4, 69.4
8/10	41°58'	159°03'	7.5	6	3	68.9, 63.5, 66.2
8/12	42°04'	159°17'	3.5	6	2	70.5, 64.7
8/13	41°45'	159°15'	8.5	8	1	63.5
8/15	42°23'	159°01'	3.0	8	3	76.3, 67.4, 76.5
8/17	42°20'	158°11'	7.5	8	15	65.5, 67.8, 71.0, 69.9, 68.5, 71.5, 54.8, 56.2, 53.5, 68.2, 65.6, 68.2, 68.1, 65.4, 68.3
8/20	42°41'	157°54'	3.5	8	1	66.1
8/21	42°34'	157°55'	5.5	8	15	65.4, 65.6, 54.5, 67.3, 68.8, 67.2, 67.4, 67.2, 82.0, 68.7, 62.7, 66.5, 65.3, 69.3, 67.8
8/24	42°06'	159°13'	6.0	8	6	67.2, 65.4, 69.2, 62.8, 54.0, 66.9
8/26	41°33'	157°37'	7.5	8	3	54.4, 66.5, 70.0
8/27	41°35'	157°14'	6.0	8	35	67.1, 66.2, 74.1, 69.3, 67.9 50.5, 64.7, 69.1, 71.8, 71.6, 63.3, 69.1, 71.0, 67.6, 69.5, 53.2, 50.7; 18 not measured
8/28	41°50'	156°59'	3.5	8	17	53.8, 52.7, 55.7, 54.1, 68.4, 66.7, 67.2, 69.1, 62.2, 52.8, 65.1, 50.4, 53.5, 52.3, 69.8, 51.7, 53.1
8/29	41°50'	157°00'	7.5	8	16	52.0, 54.7, 68.8, 65.3, 54.2, 52.8, 55.8, 64.7, 53.7, 52.9, 67.1, 51.3, 53.5, 52.7, 53.4, 74.6
8/30	42°06'	155°40'	7.5	8	1	55.3
8/31	42°33'	153°15'	9.0	6	3	69.9, 52.2, 54.0
9/1	43°34'	148°21'	13.0	6	2	54.2, 53.8
9/5	47°34'	128°28'	2.0	8	10	55.6, 54.7, 55.6, 56.1, 53.2, 54.2, 53.5, 53.3, 53.7, 54.3

Table 7.--Summary of longline catches, Hugh M. Smith cruise 46

Sta. No.	Date, 1958 GCT	Lat. N.	Long. W.	Surf. temp.1/ (°F.)		AL	Sharks	Misc.	Remarks
				S	F				
	(Start)								
60	8/14	45°08'	174°47'	55.9	56.7	0	27 GB	0	
63	8/16	43°23'	174°38'	58.9	59.1	0	41 GB 1 MS	0	
67	8/18	42°48'	175°03'	60.8	61.4	2	40 GB 2 MS	0	AL fork lengths 85.9 cm. 90.8 cm.
70	8/20	41°28'	175°06'	61.5 63.5	61.6 63.3	0	18 GB 1 MKS	0	Line set across a front
88	8/27	40°13'	170°20'	62.9	63.1	0	28 GB	0	
90	8/29	42°13'	170°11'	60.5	61.2	0	66 GB	1 Alepisaurus (head only)	
98	9/2	46°28'	164°29'	53.0	53.3	0	1 GB 1 MS	2 Alepisaurus	

1/ S indicates start; F indicates finish.

Table 8.--Length frequency distribution, by stations, of albacore caught by the gill net, Hugh M. Smith cruise 46

Length (cm.)	Station No.						Total
	32	40	60	63	67	68	
50	-	-	-	-	-	-	-
51	1	-	-	1	-	-	2
52	-	-	-	-	3	-	3
53	-	-	-	1	6	-	7
54	1	-	-	1	4	3	9
55	-	-	-	4	10	2	16
56	1	-	-	1	3	-	5
57	-	-	-	-	1	-	1
58	-	-	-	-	-	1	1
59	-	-	-	-	-	-	-
60	-	-	-	-	-	-	-
61	-	-	-	-	-	-	-
62	-	-	-	1	-	-	1
63	-	-	-	-	-	-	-
64	-	-	-	-	-	-	-
65	-	-	-	-	1	-	1
66	-	2	-	1	-	-	3
67	-	-	1	-	3	-	4
68	-	1	-	4	3	-	8
69	-	-	-	5	2	-	7
70	-	-	1	1	4	-	6
71	-	1	1	1	3	-	6
72	-	-	-	1	1	-	2
73	-	-	-	1	1	-	2
74	-	-	-	1	1	-	2
75	-	-	-	-	-	-	-
76	-	-	-	-	2	-	2
77	-	-	-	-	1	-	1
78	-	-	-	-	-	-	-
79	-	-	-	1	-	-	1
80	-	-	-	-	-	-	-
81	-	-	-	-	-	-	-
82	-	-	-	-	-	-	-
83	-	-	-	-	1	-	1
84	-	-	-	1	-	-	1
85	-	-	-	-	-	-	-
86	-	-	-	-	-	-	-
87	-	-	-	-	-	-	-
88	-	-	-	-	-	1	1
89	-	-	-	-	-	-	-
90	-	-	-	-	-	-	-
Total	3	4	3	26	50	7	93

Table 9.--Length frequency distribution, by stations, of albacore caught by the gill net, M/V Paragon

Length (cm.)	Station Number																												Total
	1	2	3	4	5	6	7	8	10	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
50	-	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	3
52	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	3
53	-	-	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	4
54	-	-	-	7	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	9
55	1	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	3
56	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
57	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
59	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	2
61	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	2
62	-	1	-	-	-	-	3	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1
63	1	-	3	-	-	-	-	-	-	-	-	3	-	-	3	-	-	-	-	1	-	1	1	-	1	1	1	1	17
64	1	1	-	-	2	-	1	-	-	1	-	-	-	1	3	1	1	-	-	1	1	-	2	-	1	-	1	2	20
65	-	4	4	-	2	-	3	3	-	-	1	2	1	-	2	1	-	1	-	3	-	1	5	3	1	2	2	4	45
66	-	5	6	-	2	-	4	6	1	3	1	2	3	3	6	7	4	2	1	5	2	-	4	3	2	4	1	5	82
67	1	2	6	-	3	2	1	2	-	1	1	-	2	2	2	6	5	3	2	-	1	-	7	1	5	8	5	6	74
68	4	4	1	-	1	2	2	1	-	2	4	2	4	2	2	5	1	-	2	3	-	-	3	3	7	4	5	2	66
69																													
70	1	2	2	1	3	1	3	3	-	3	1	1	4	2	4	2	5	6	2	7	1	-	-	2	2	11	6	2	77
71	2	3	1	-	1	-	1	1	-	3	2	2	1	-	10	3	3	1	1	1	2	-	-	-	3	6	-	1	48
72	2	-	-	-	2	1	1	-	-	4	1	3	1	2	1	3	4	2	-	2	-	-	-	1	4	3	-	1	38
73	1	-	-	-	-	1	1	-	1	3	-	3	2	1	2	1	-	1	-	-	1	-	2	-	-	-	-	2	22
74	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	1	1	-	-	-	2	-	-	1	-	8
75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	1	-	-	-	-	-	-	-	-	3
76	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
77	-	1	-	-	1	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	7
78	1	-	-	-	-	-	-	1	-	-	-	-	1	1	2	-	1	1	-	-	-	-	-	-	-	-	2	-	10
79	1	2	-	-	-	-	-	-	-	1	-	-	2	1	1	-	3	-	1	-	1	-	1	1	-	-	1	-	16
80	2	-	1	-	-	-	-	-	1	-	-	1	1	-	-	-	-	-	-	-	-	-	2	1	1	-	-	-	10
81	2	2	-	-	2	1	-	-	-	-	-	-	2	-	-	-	1	1	-	-	-	-	1	-	-	-	1	-	13
82	4	2	-	-	1	2	-	1	-	3	-	1	2	1	-	-	-	-	-	-	-	-	5	1	1	-	2	-	26
83	2	-	1	-	2	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	1	-	3	1	-	-	1	-	13
84	2	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	5
85	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	3
86	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	1	-	-	-	-	3
87	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	2
88	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	1	3
89	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	3
90	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
91	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1
92	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	2
93	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
95	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
96	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
98	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
Total	30	30	27	16	25	11	21	19	3	24	11	25	30	16	39	31	30	24	10	26	12	5	42	24	30	39	30	30	660

Table 10.--Summary of night light observations on the abundance of saury and squid, Hugh M. Smith cruise 46

Sta. No.	Date, 1958	Zone time	Position		Saury		Squid		Type of light 1/	Surface temp. (°F.) 2/
			Lat. N.	Long. W.	Number	Size (inches)	Number	Size (inches)		
13	7/25	2000-2045	34°01'	158°54'	0	-	2	12	S	74.7
					-	-	2	4-6	S	-
16	7/26	2030-2100	37°25'	159°09'	-	-	-	-	S	71.8
19	7/28	0130	39°49'	159°18'	-	-	1	12	C	66.8
22	7/28	2115-2240	40°49'	159°38'	4	10-12	-	-	C	63.1
26	7/29	2300-0000	41°20'	159°56'	6	12	1	3	S&C	61.3
					2	2.5	-	-	S&C	-
29	7/30	2130-2330	41°46'	159°34'	25	3	3	4	S&C	58.7
					1	10	-	-	S&C	-
33	7/31	1930-2020	41°09'	158°24'	25-30	10-12	2	12	C	61.4
		2145-2210	41°09'	158°24'	1	10	-	-	C	-
					4	3	-	-	S&C	-
37	8/1	2200-2245	42°19'	158°22'	3	8-10	1	12	S&C	59.8
					6	3	3	6	S&C	-
40	8/2	2215-2230	43°10'	158°47'	3	3	-	-	C	56.7
50	8/7	2133-2200	54°00'	159°55'	-	-	-	-	S	52.3
56	8/12	2300-0200	46°12'	174°56'	200-300	7-11	4	10-16	S&C	54.7
60	8/13	2300-2345	45°12'	174°53'	50-75	6-8	4	6	S&C	55.2
	8/14	0130-0245	45°12'	174°53'	200-300	6-8	2	28-30	C	-
					-	-	5	6-12	C	-
					-	-	2	18-24	C	-
61	8/14	2100-0000	44°39'	174°48'	50-100	6-8	-	-	S&C	57.8
					6	10-11	25	3-6	S&C	-
					-	-	3-4	18	S&C	-
	8/15	0200	44°39'	174°48'	100-200	6-8	-	-	C	-
63	8/15	2130-0000	43°29'	174°48'	20-50	6	2	3	S	59.0
64	8/17	0130	43°22'	174°43'	2-3	?	6	12	C	58.8
67	8/17	2100-2200	42°48'	175°08'	10	11	1	12	S	61.0
	8/18	0130	42°48'	175°08'	-	-	6	large	C	-
68	8/19	0130	42°48'	175°02'	few	?	1	?	C	61.4
69	8/19	2230-2245	41°35'	175°08'	3-4	10-12	6	12-16	S&C	61.5
	8/20	0130	41°35'	175°08'	11	12	?	small	C	-
76	8/22	2200-0000	41°35'	175°10'	3	2-5	3-4	3	S&C	61.9
			41°35'	175°10'	-	-	4-5	12	S&C	-
	8/23	0100-0130	41°35'	175°10'	5-6	10-12	10	12	C	-
85	8/25	2300	39°53'	170°46'	2-3	12	few	8-12	C	66.7
88	8/26	2130-2230	40°20'	170°16'	3	12	-	-	C	63.2
	8/27	0130-0200	40°15'	170°16'	7	11.5-13.5	2	19-21	C	-
		0230	40°15'	170°16'	5	12	-	-	C	-
90	8/28	2230-0000	42°21'	170°12'	-	-	-	-	S	61.1
91	8/29	2100-2300	42°46'	170°03'	1	1.5	1	24	S&C	56.7
96	8/31	1800-2045	45°46'	168°46'	3-4	10	-	-	C	55.0
98	9/1	2230-0000	46°34'	164°44'	100-200	3-12	12-15	6	S&C	53.3
99	9/2	2125-2214	45°38'	164°47'	10-15	12	2-3	24	C	54.0

1/ S=one 300-watt light submerged to 1 meter; C=vessel's cargo lights.

2/ Taken from the BT prior to the station.

Table 11.--Record of daily sightings of bird flocks, scattered birds, fish schools, and aquatic mammals, Hugh M. Smith cruise 46

U - unidentified
SK - shark
W - whale
P - porpoise

SW - sperm whale
SJ - skipjack
KW - killer whale
FS - fur seal

S - small
M - medium
L - large
Und - undetermined

Date, 1958	Noon position		Flocks									Scattered birds														Tuna schools	Aquatic mammals
				Number of birds			Species comprised																					
	Lat. N.	Long. W.	Total No.	< 10	10-50	> 50	Booby	Sea gull	Frigate bird	Tern	Petrel or shearwater	Black-footed albatross	Laysan albatross	Petrel or shearwater	Booby	Tern	Frigate bird	Tropic bird	Storm petrel	Sea parrot	Puffin	Snipe	Jaeger	Sea gull	Unidentified	Flying fish		
7/22	22°40'	158°31'	4	-	1	3	-	1	2	4	4	-	-	15	-	20	1	7	7	-	-	-	-	-	-	-	L-SJ Und-U M-U	W-1
7/23	25°59'	158°37'	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	4	-	-	-	-	-	-	-	3	-	-
7/24	29°20'	158°49'	-	-	-	-	-	-	-	-	-	5	-	10	-	1	-	1	3	-	-	-	-	-	-	-	-	-
7/25	32°56.7'	158°49'	-	-	-	-	-	-	-	-	-	8	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	W-1
7/26	36°14'	159°00'	-	-	-	-	-	-	-	-	-	22	-	6	-	-	-	1	2	-	-	-	-	-	-	-	-	-
7/27	38°53'	159°13'	-	-	-	-	-	-	-	-	-	37	-	20	-	22	-	-	73	-	-	-	2	-	-	-	-	-
7/28	40°31'	159°18'	-	-	-	-	-	-	-	-	-	71	-	17	5	64	-	-	48	-	-	4	-	-	-	-	-	-
7/29	41°14'	159°39'	1	-	1	-	-	-	-	-	1	51	-	8	-	1	-	-	42	-	-	-	1	-	-	-	-	S-2
7/30	41°58'	159°57'	-	-	-	-	-	-	-	-	-	62	-	16	-	20	-	-	19	-	-	-	-	3	-	-	-	-
7/31	41°15'	158°43'	-	-	-	-	-	-	-	-	-	58	-	12	-	2	-	-	32	-	-	-	-	1	-	-	-	W-1
8/1	41°40'	158°22'	-	-	-	-	-	-	-	-	-	12	-	-	-	-	-	-	3	-	-	-	-	22	2	-	-	-
8/2	42°53'	158°30'	-	-	-	-	-	-	-	-	-	23	-	1	-	2	-	-	6	-	-	-	-	7	-	-	-	P-2 W-1
8/5	46°43'	159°45'	-	-	-	-	-	-	-	-	-	2	-	4	-	3	-	-	10	-	-	-	-	6	-	-	-	SW-7 FS-7 P-4
8/6	49°41'	159°45'	-	-	-	-	-	-	-	-	-	4	-	36	-	-	-	-	54	-	-	-	-	2	2	-	-	W-4 P-4
8/7	52°49'	159°56'	4	-	1	3	-	3	-	-	3	4	-	133	-	4	-	-	17	-	-	49	15	-	-	-	Und-2	UW-2 P-4
8/8	52°17'	161°28'	-	-	-	-	-	-	-	-	-	-	-	75	-	-	-	-	14	4	-	-	-	-	-	-	-	FS-1 P-15
8/9	50°13'	165°00'	-	-	-	-	-	-	-	-	-	-	-	51	-	-	-	-	33	-	-	7	-	-	-	-	-	P-2
8/10	49°49'	170°10'	1	-	1	-	-	-	-	-	1	7	-	71	-	7	-	-	33	4	4	-	-	-	-	-	-	KW-3 W-2 P-8
8/12	46°54'	174°59'	-	-	-	-	-	-	-	-	-	12	5	11	4	-	-	-	10	-	-	-	-	-	-	-	-	-
8/13	45°36'	174°56'	-	-	-	-	-	-	-	-	-	10	-	36	-	-	-	-	11	-	-	-	-	-	-	-	-	-
8/14	45°08'	174°44'	-	-	-	-	-	-	-	-	-	2	-	21	-	-	-	-	3	-	-	-	-	-	-	-	-	FS-1
8/15	44°16'	174°42'	-	-	-	-	-	-	-	-	-	7	3	84	-	-	-	-	5	-	-	-	4	-	-	-	-	W-1
8/16	43°22'	174°43'	-	-	-	-	-	-	-	-	-	3	1	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8/17	42°57'	174°57'	-	-	-	-	-	-	-	-	-	6	2	12	-	-	-	-	1	-	-	-	-	-	-	-	-	-
8/22	41°33'	175°02'	-	-	-	-	-	-	-	-	-	48	1	4	-	-	-	-	26	-	-	-	-	-	-	-	-	SK-1
8/23	41°04'	175°10'	-	-	-	-	-	-	-	-	-	22	9	-	-	-	-	-	2	-	-	-	-	-	1	-	-	-
8/24	38°14'	175°00'	1	-	1	-	-	-	-	-	1	13	6	94	-	-	-	1	16	-	-	-	-	-	-	-	-	-
8/25	39°28'	170°58'	-	-	-	-	-	-	-	-	-	27	-	13	-	-	-	-	17	-	-	-	-	-	-	-	-	-
8/28	41°42'	170°32'	-	-	-	-	-	-	-	-	-	33	6	14	-	3	-	-	32	-	-	-	-	2	-	-	-	SW-1
8/31	44°58'	168°42'	-	-	-	-	-	-	-	-	-	15	-	6	-	1	-	-	6	-	-	-	-	1	-	-	-	-
9/1	46°16'	165°29'	-	-	-	-	-	-	-	-	-	12	-	14	-	-	-	-	7	-	-	-	-	-	-	-	-	P-5
9/3	44°41'	165°05'	-	-	-	-	-	-	-	-	-	21	1	5	-	-	-	-	6	-	-	-	-	-	-	-	-	-
9/4	41°58'	163°46'	-	-	-	-	-	-	-	-	-	8	5	3	-	1	-	-	25	-	-	-	-	-	-	-	-	-
9/5	37°46'	163°09'	-	-	-	-	-	-	-	-	-	6	-	3	-	-	-	-	9	-	-	-	-	-	-	1	-	-
9/6	34°13'	161°59'	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
9/7	30°24'	160°37'	-	-	-	-	-	-	-	-	-	2	-	3	-	-	-	1	1	-	-	-	-	-	-	-	-	-
9/8	26°31'	159°32'	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	1	-	-	-	-	-	-	-	-	-	-
9/9	22°40'	158°30'	1	-	-	1	1	-	-	1	1	-	-	37	1	11	-	3	-	-	-	-	2	-	-	-	-	-

Table 12.--Zooplankton station data and volumes, Hugh M. Smith cruise 46

Station and Tow	Date, 1958	Time (GCT)	Latitude N.	Longitude W.	Depth (m.)	Volume (cc./1000 $m.^3$)
2-A	7/22	0823-0845	-	-	75	-
2-B	7/22	0849-0916	-	-	57	-
4-1	7/23	0723-0756	23°56'	158°28'	142	39
4-2	7/23	0801-0820	23°56'	158°28'	Surface	19
7-1	7/24	0750-0823	27°08'	158°38'	130	56
7-2	7/24	0828-0850	27°08'	158°38'	Surface	39
10-1	7/25	0819-0855	30°36'	158°56'	137	28
10-2	7/25	0901-0922	30°36'	158°56'	Surface	27
13-1	7/26	0804-0836	34°03'	158°54'	144	60
16-1	7/27	0845-0919	37°25'	159°09'	141	45
16-2	7/27	0920-0940	37°25'	159°09'	Surface	37
19-1	7/28	0858-0938	39°41'	159°24'	140	52
19-2	7/28	0940-1000	39°41'	159°24'	Surface	53
22-1	7/29	0845-0915	40°49'	159°38'	150	35
22-2	7/29	0920-0940	40°49'	159°38'	Surface	19
26-1	7/30	0841-0920	41°20'	159°56'	109	47
26-2	7/30	0922-0937	41°20'	159°56'	Surface	28
29-1	7/31	0751-0825	41°46'	159°24'	142	62
29-2	7/31	0821-0847	41°46'	159°24'	Surface	23
33-1	8/1	0740-0812	41°09'	158°24'	123	47
33-2	8/1	0813-0837	41°09'	158°24'	Surface	36
37-1	8/2	0745-0815	42°19'	158°22'	140	68
37-2	8/2	0818-0838	42°19'	158°22'	Surface	20
40-1	8/3	0752-0824	43°10'	158°47'	140	26
40-2	8/3	0836-0856	43°10'	158°47'	Surface	22
43-1	8/5	0820-0853	45°02'	159°23'	143	76
43-2	8/5	0855-0915	45°02'	159°23'	Surface	124
46-1	8/6	1030-1104	48°06'	159°42'	141	96
46-2	8/6	1106-1126	48°06'	159°42'	Surface	158
48-1	8/7	0828-0905	50°56'	159°49'	142	177
48-2	8/7	0907-1030	50°56'	159°49'	Surface	226
50-1	8/8	0743-0809	54°00'	159°56'	140	171
50-2	8/8	0812-0833	54°00'	159°56'	Surface	333
53-1	8/12	1213-1240	48°03'	174°45'	140	216
53-2	8/12	1244-1304	48°03'	174°45'	Surface	-
56-1	8/13	0839-0917	46°12'	174°56'	137 meter malfunctioned	
56-2	8/13	0920-0940	46°12'	174°56'	Surface	285
60-1	8/14	0824-0847	45°11'	174°54'	114	78
63-1	8/16	0626-0646	43°29'	174°48'	145	86
63-2	8/16	0750-0815	43°29'	174°48'	Surface	123
64-1	8/17	0535-0550	43°22'	174°43'	142	52
67-1	8/18	0600-0636	42°48'	175°08'	142	42
68-1	8/19	0620-0640	42°46'	175°08'	Surface	21
69-1	8/20	0808-0828	41°35'	175°08'	143 meter malfunctioned	
69-2	8/20	0843-0905	41°35'	175°08'	Surface	139
71-1	8/22	2320-2330	41°33'	175°02'	Surface	not determined
75-1	8/23	0539-0617	41°35'	175°01'	137	45
79-1	8/24	0526-0550	40°29'	175°11'	143	17
79-2	8/24	0552-0617	40°29'	175°11'	Surface	17
85-1	8/26	0908-0939	39°50'	170°52'	112	55
85-2	8/26	0942-1003	39°50'	170°52'	Surface	43
88-1	8/27	0525-0557	40°15'	170°16'	141	33
88-2	8/27	0859-0914	40°15'	170°16'	Surface	20
90-1	8/29	0835-0848	42°21'	170°12'	140	145
90-2	8/29	0852-0910	42°21'	170°12'	Surface	937
91-1	8/30	0936-1012	42°50'	169°57'	156	77
91-2	8/30	1014-1035	42°50'	169°57'	Surface	240

Table 12.--Zooplankton station data and volumes, Hugh M. Smith cruise 46 (cont'd)

Station and Tow	Date, 1958	Time (GCT)	Latitude N.	Longitude W.	Depth (m.)	Volume (cc./1000 $m.^3$)
94-1	8/31	0509-0539	43°57'	169°30'	173	43
94-2	8/31	0541-0605	43°57'	169°30'	Surface	14
96-1	9/1	0618-0647	45°45'	168°47'	141	112
96-2	9/1	0723-0744	45°45'	168°47'	Surface	36
98-1	9/2	0459-0521	46°34'	168°44'	140	51

Table 13.--Station curves and observed oceanographic data,
Hugh M. Smith cruise 46

Notes on Oceanographic Station Curves

Thermosteric anomaly (oblique lines) are in centiliters per ton (Montgomery 1954). Where temperatures of paired thermometers differed by more than 0.05°C. below 300 m. or more than 0.10°C. above 300 m., both values are plotted and designated by the symbol ⁂ . The other variables are plotted for each of the temperature values. When the station curve is not drawn through a plotted value, it is considered a gross error and not used.

Explanatory code for station curves:

⁂ Reversing thermometer temperatures °C.
• BT temperature °C.
⊡ Salinity °/oo.
▽ Dissolved oxygen ml./L.

Notes on Observed Oceanographic Data

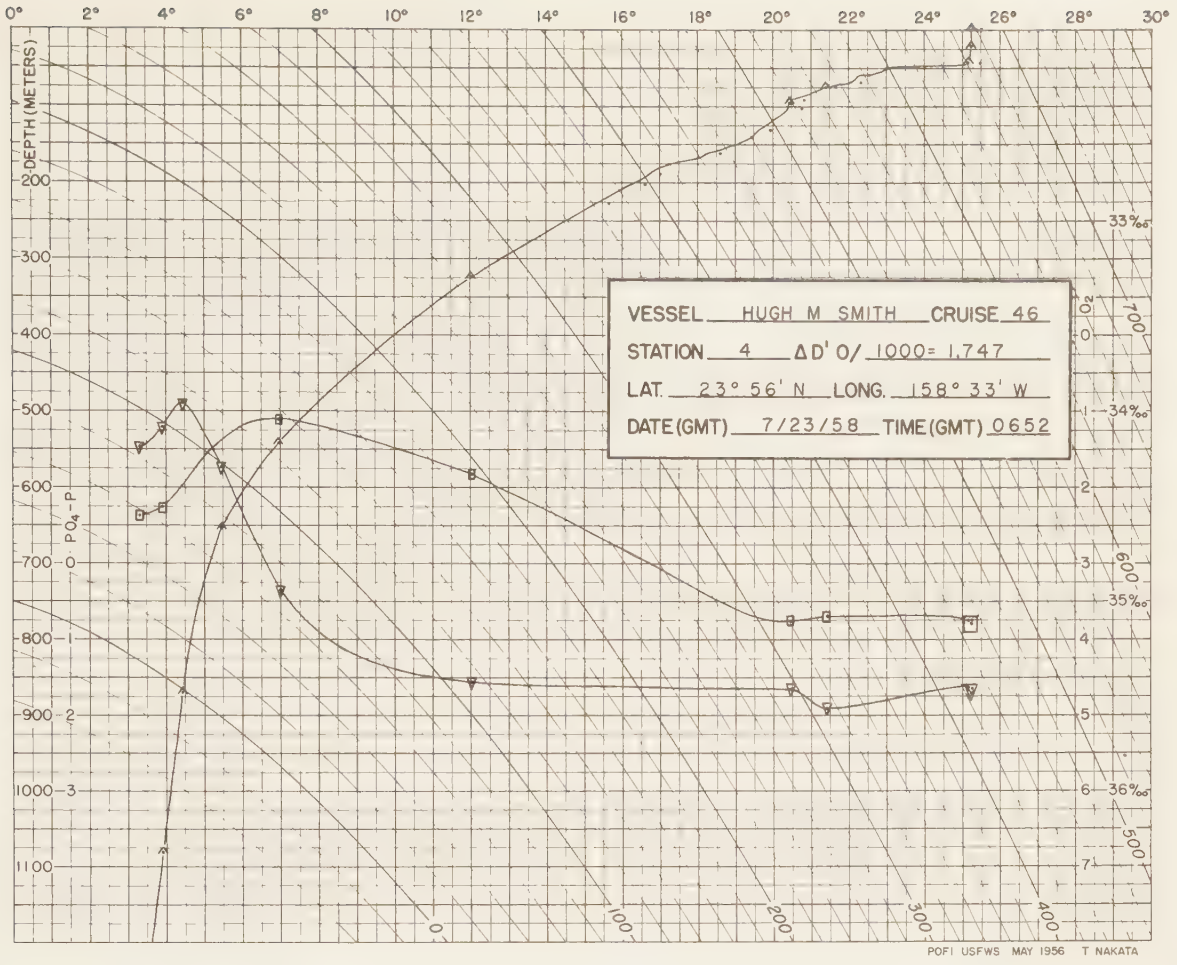
Where more than one cast was made on a station, they are separated by a horizontal line. The cast number is indicated by a Roman numeral in the margin.

Where the corrected readings of the paired protected thermometers differed by more than 0.05°C. below 300 m. or more than 0.10°C. above 300 m., both temperature values are tabulated and the depth and salinity are repeated. Delta-t calculated using each temperature value is carried.

Explanatory code for tabulated data:

NG - The value or line is in error and is discarded.
Q - The value seems questionable but was used in construction of the station curve.
P - The value is questionable and while carried was not used in drawing the station curve.
NS - No sample.
(2) - Indicates H_2S precipitate in salinity sample.

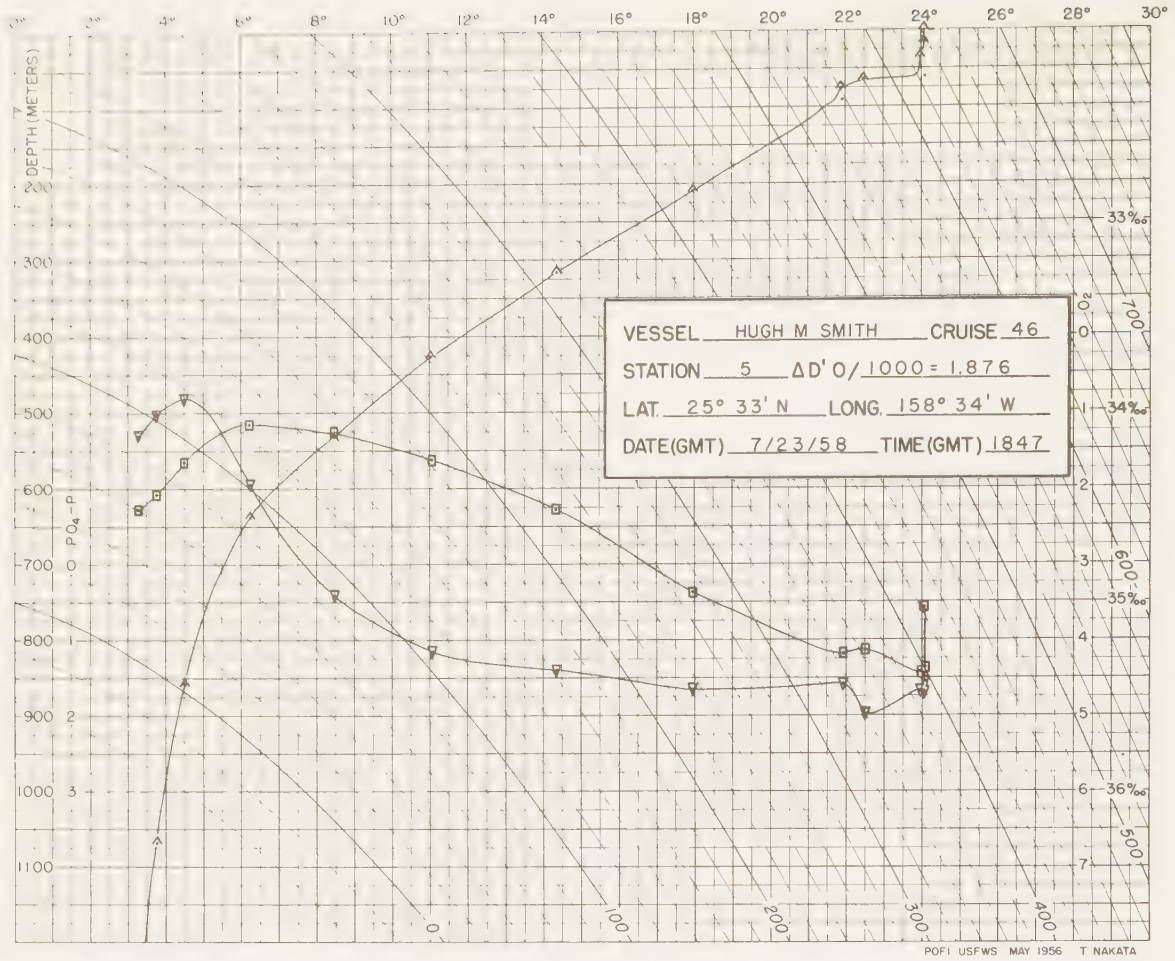
NOTE: In calculating the depths of reversal from the readings of unprotected reversing thermometers, an error was introduced into the formula $D = \frac{Tu - Tw}{Q \quad \rho_m}$. Instead of the factor $1/(Q \times \rho_m)$, values for $(1/Q) \times \rho_m$ were used. Therefore, multiplication of depth in table 13 by 0.942 will give the proper value for the depth of each observation.


VESSEL HUGH M SMITH CRUISE 46
STATION 4 ΔD' O/ 1000= 1.747
LAT. 23° 56' N LONG. 158° 33' W
DATE (GMT) 7/23/58 TIME (GMT) 0652
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: 02, cloud coverage: not recorded. Wind: 060°, 18 kts. Sea: 3-5 ft. Wire angle: < 03°. BT slide: 15. Dry bulb: 76.2°F. Wet bulb: 70.8°F. Barometric pressure: 1019 mbs.

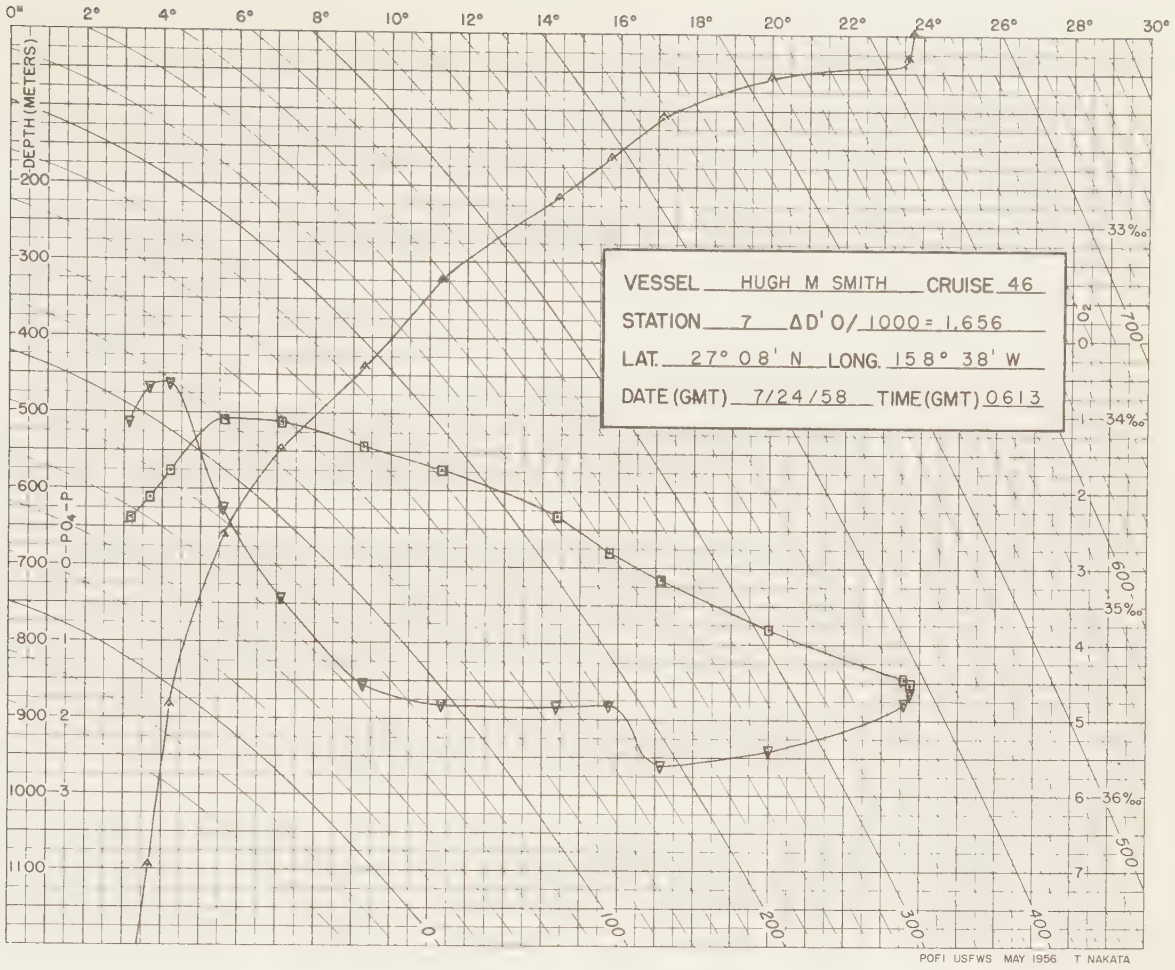
Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	25.23	35.10	452.2	4.66	0.58
21	25.22	35.12	450.6	4.72	0.43
42	25.14	35.10	449.8	4.64	0.47
74	21.40	35.08	347.8	4.91	0.49
96	20.44	35.10	321.5	4.66	0.58
218	NG	34.64	-	4.38	1.31
324	12.04	34.33	193.8	4.57	1.23
436	NG	35.17	-	4.31	1.76
542	6.95	34.04	135.8	3.34	2.38
653	5.45	34.54 P	80.3	1.73	3.19
870	4.43	34.94 P	39.2	0.89	3.69
1081	3.90	34.50	66.9	1.20	3.46
1297	3.33	34.55	57.9	1.47	3.77* 3.19

*Values of duplicate did not agree within 0.1 µg at./L. tolerance so both are carried.


VESSEL HUGH M SMITH CRUISE 46
STATION 5 ΔD' O/1000 = 1.876
LAT. 25° 33' N LONG. 158° 34' W
DATE(GMT) 7/23/58 TIME(GMT) 1847
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: 03, cloud coverage: 9. Wind: 050°, 10 kts. Sea: 1-3 ft. Wire angle: 00°.
BT slide: 19. Dry bulb: 76.8°F. Wet bulb: 71.9°F. Barometric pressure: 1020 mbs.

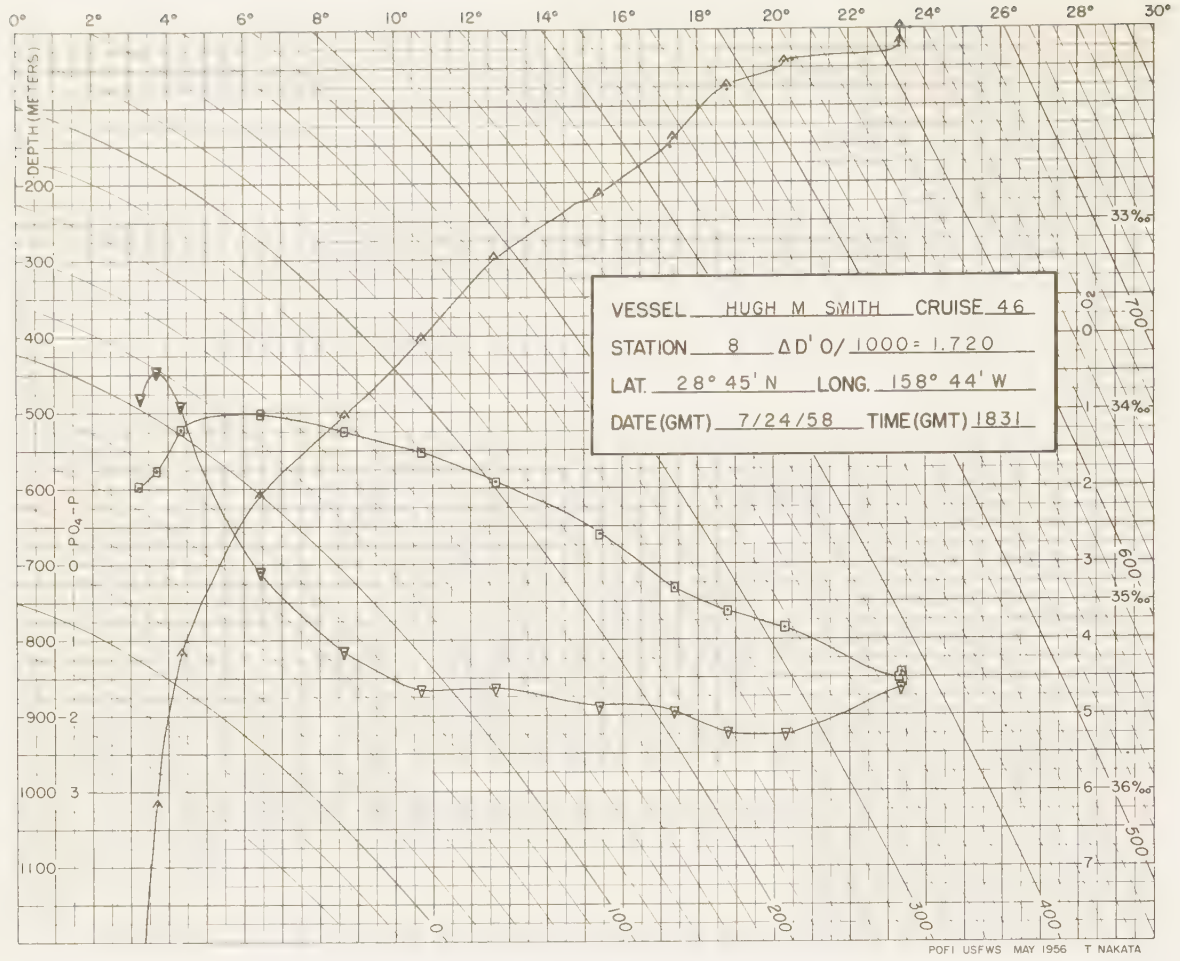
Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	24.06	35.35	400.9	4.55	0.30
15	24.04	35.03	423.4	4.70	0.25
36	23.97	35.37	396.7	4.99	0.35
66	22.48	35.25	364.2	4.67	0.48
76	21.92	35.27	347.7	4.59	0.35
210	17.96	34.95	271.7	4.66	0.63
316	14.37	34.51	225.4	1.02	2.29
427	11.05	34.25	182.4	0.81	2.92
532	8.46	34.11	151.7	1.94	2.08
638	6.24	34.06	125.5	3.41	1.24
858	4.50	34.26	91.0	4.40	0.66
1068	3.76	34.43	70.8	4.16	0.43
1282	3.29	34.51	60.4	1.29	3.71


VESSEL HUGH M SMITH CRUISE 46
STATION 7 ΔD' O/ 1000 = 1.656
LAT. 27° 08' N LONG. 158° 38' W
DATE (GMT) 7/24/58 TIME (GMT) 0613
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: 02, cloud coverage: 2. Wind: 070°, 14 kts. Sea: 3-5 ft. Wire angle: 01°. BT slide: 22. Dry bulb: 75.3°F. Wet bulb: 69.8°F. Barometric pressure: 1020 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	23.74	35.42	386.7	4.61	0.40
32	23.58	35.39	384.2	4.78	0.20
58	19.98	35.12	308.4	5.42	0.09
110	17.13	34.86	259.2	5.61	0.24
163	15.75	34.72	238.9	4.82	0.38
216	14.38	34.53	224.2	4.84	0.48
324	11.34	34.29	184.6	4.82	0.98
439	9.29	34.17	159.7	4.56	1.51
548	7.10	34.04	137.9	3.42	2.22
662	5.60	34.03	120.3	2.25	2.93
884	4.21	34.30	84.9	0.61	3.59
1097	3.66	34.44	69.1	0.67	3.70
1312	3.16	34.55	56.3	1.12	2.65*
					3.35

*Values of duplicate did not agree within 0.1 µg at./L. tolerance so both are carried.

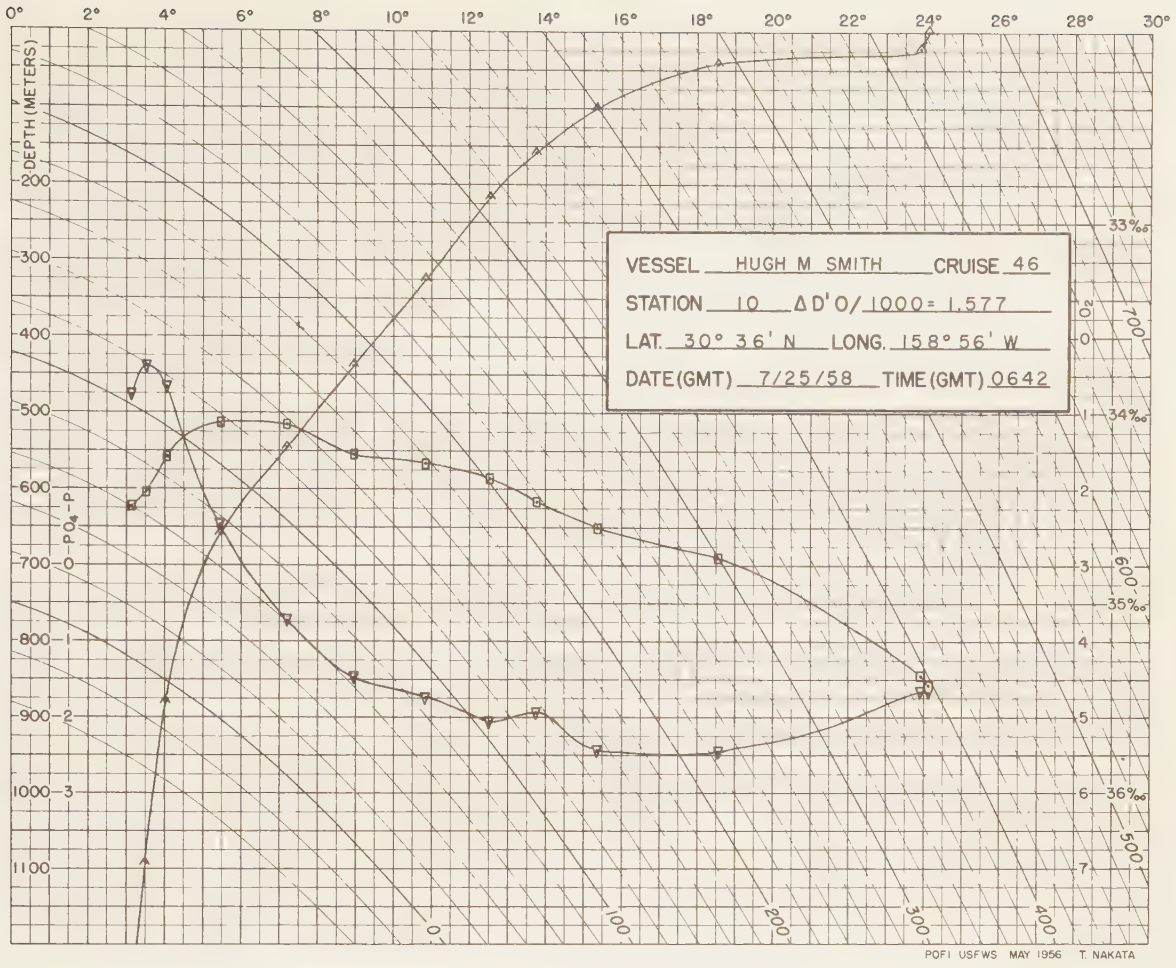

VESSEL HUGH M SMITH CRUISE 46
STATION 8 ΔD' O/ 1000 = 1.720
LAT. 28° 45' N LONG. 158° 44' W
DATE (GMT) 7/24/58 TIME (GMT) 1831
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: 02, cloud coverage: 9. Wind: 100°, 10 kts. Sea: 1-3 ft. Wire angle: 20°.
BT slide: 27. Dry bulb: 75.9°F. Wet bulb: 70.0°F. Barometric pressure: 1021 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	23.36	35.38	378.8	4.66	0.30
20	23.34	35.40	376.9	4.66	0.12
44	20.30	35.14	315.1	5.24	0.12
73	18.77	35.05	283.8	5.22	Trace
142	17.36	34.93	259.4	4.96	0.17
215	15.41	34.64	237.4	4.87	0.35
299	12.65	34.37	202.1	4.63	0.62
404	10.68	34.21	179.0	4.66	0.70
504	8.65	34.10	155.3	4.14	0.96
610	6.43	34.01	131.7	3.09	2.05
817	4.36	34.09	102.3	0.91	3.10
1018	3.68	34.31	79.0	0.48	3.45
1223	3.26	34.39 1/	69.2	0.81	3.47*
					3.11

1/ Sample bottle only 3/4 full.

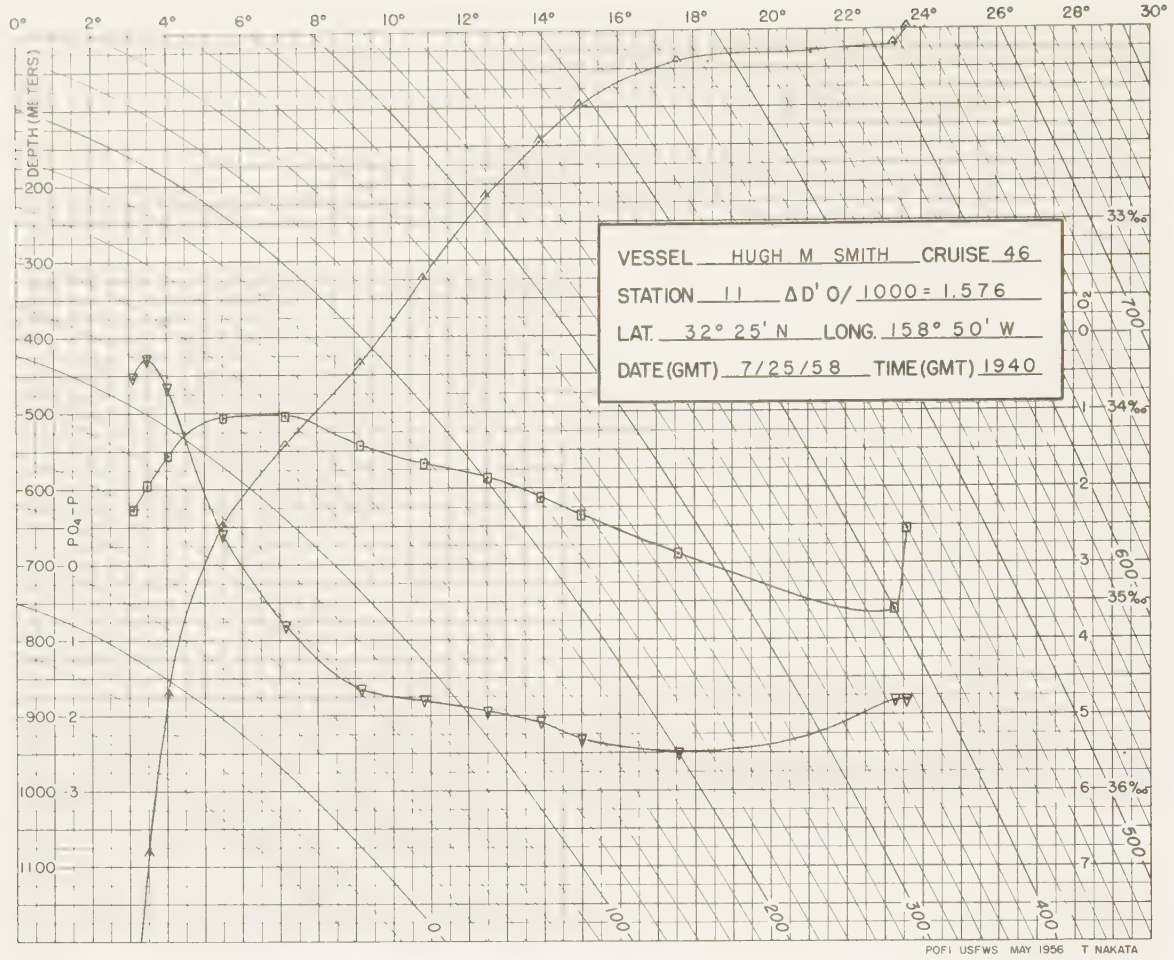
*Values of duplicate did not agree within 0.1 µg at./L. tolerance so both are carried.


VESSEL HUGH M SMITH CRUISE 46
STATION 10 Δ D' O/ 1000 = 1.577
LAT. 30° 36' N LONG. 158° 56' W
DATE (GMT) 7/25/58 TIME (GMT) 0642
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T. NAKATA

Weather: 02, cloud coverage: 2. Wind: 120°, 10 kts. Sea: 1-3 ft. Wire angle: 04°.
BT slide: 31. Dry bulb: 75.1°F. Wet bulb: 68.5°F. Barometric pressure: 1019 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	24.10	35.43	396.1	4.68	0.66
21	23.88	35.38	393.4	4.68	0.11
41	18.56	34.76	299.8	5.46	0.13
100	15.36	34.60 2/	239.4	5.43	0.17
159	13.75	34.46	216.8	4.94	0.34
217	12.54	34.34	202.5	5.06	0.45
326	10.85	34.26 2/	178.1	4.74	0.80
439	8.96	34.22 2/	150.8	4.49	1.20
546	7.20	34.06 2/	137.7	3.72	1.47
659	5.43	34.05 2/	116.8	2.47	2.48
879	4.02	34.23 2/	88.4	0.67	2.68
1091	3.52	34.41	70.1	0.39	3.30
1303	3.14	34.49	60.6	0.77	3.28

2/ Indicates H_2S precipitate in salinity sample.

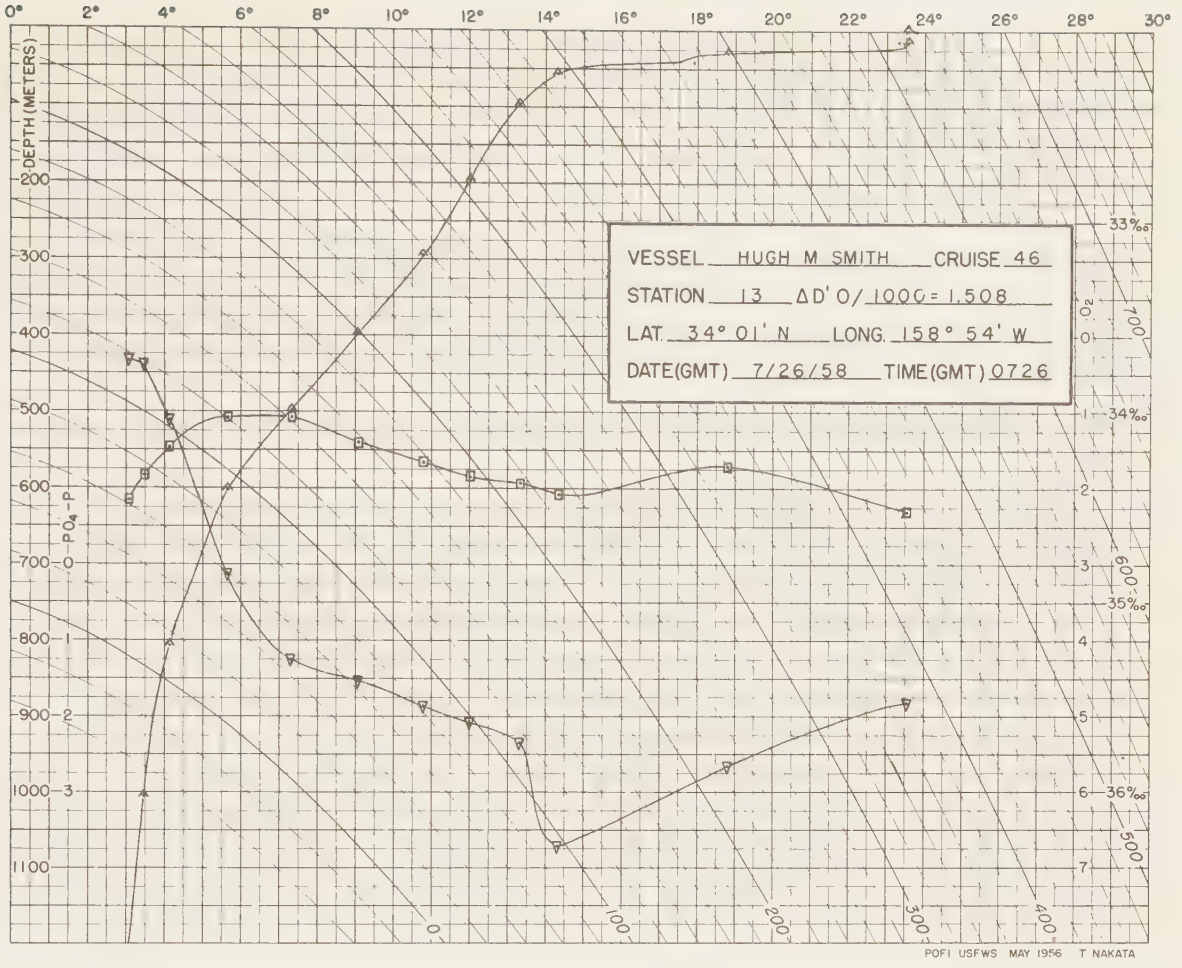

VESSEL HUGH M SMITH CRUISE 46
STATION 11 ΔD' O/ 1000 = 1.576
LAT. 32° 25' N LONG. 158° 50' W
DATE (GMT) 7/25/58 TIME (GMT) 1940
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather 02, cloud coverage: 4. Wind: 190°, 13 kts. Sea: 1-3 ft. Wire angle: < 03°.
BT slide: 35. Dry bulb: 75.0°F. Wet bulb: 69.1°F. Barometric pressure: 1018 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	23.60	34.62	440.3	4.81	0.12
20	23.26	35.05 2/	399.9	4.82	0.32
41	17.57	34.75 2/	277.2	5.49	0.26
99	14.98	34.54 2/	235.8	5.32	0.12
146	13.92	34.45	220.9	5.10	0.37
215	12.52	34.34 2/	201.8	4.96	0.64
322	10.84	34.27 2/	177.2	4.80	1.00
435	9.16	34.17	157.6	4.65	1.24
542	7.16	34.01 2/	140.8	3.80	1.40
648	5.50	34.02	119.9	2.61	2.42
871	4.02	34.22 2/	89.1	0.67	3.40
1082	3.48	34.38	72.0	0.29	2.82
1294	3.10	34.51	58.7	0.52	3.48*
					3.00

2/ Indicates H_2S precipitate in salinity sample.

*Values of duplicate did not agree within 0.1 µg at./L. tolerance so both are carried.

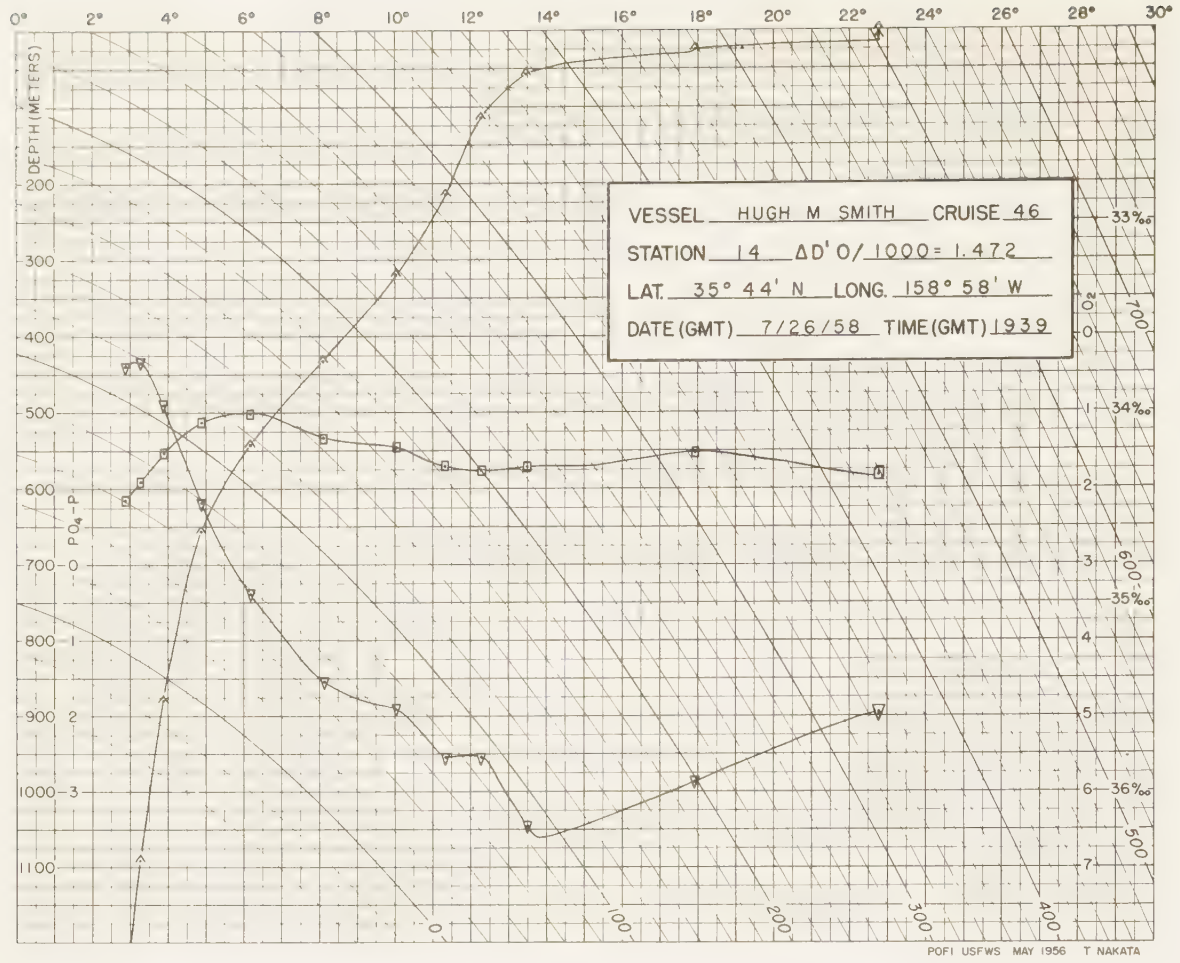

VESSEL HUGH M SMITH CRUISE 46
STATION 13 ΔD' O/1000 = 1.508
LAT. 34° 01' N LONG. 158° 54' W
DATE(GMT) 7/26/58 TIME(GMT) 0726
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: 03, cloud coverage: not recorded. Wind: 180°, 20 kts. Sea: 3-5 ft. Wire angle: 21°. BT slide: 39. Dry bulb: 75.2°F. Wet bulb: 71.2°F. Barometric pressure: 1016 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	23.56	34.52	446.4	4.83	0.32
15	23.55	34.52	446.2	5.70	0.20
29	18.80	34.28	340.5	5.66	Trace
57	14.32	34.43	230.2	6.71	0.42
96	13.32	34.37	215.0	5.34	0.59
197	12.00	34.34	192.3	5.08	0.59
295	10.80	34.26	177.3	4.87	0.83
398	9.06	34.16 2/	156.8	4.53	0.83
498	7.32	34.03 2/	141.6	4.24	1.32
602	5.65	34.03 2/	120.8	3.13	1.82
806	4.14	34.19 2/	92.5	1.11	2.92
1006	3.46	34.33	75.6	0.40	3.09
1210	3.06	34.46 2/	62.2	0.33	3.17*
					3.00

2/ Indicates H_2S precipitate in salinity sample.

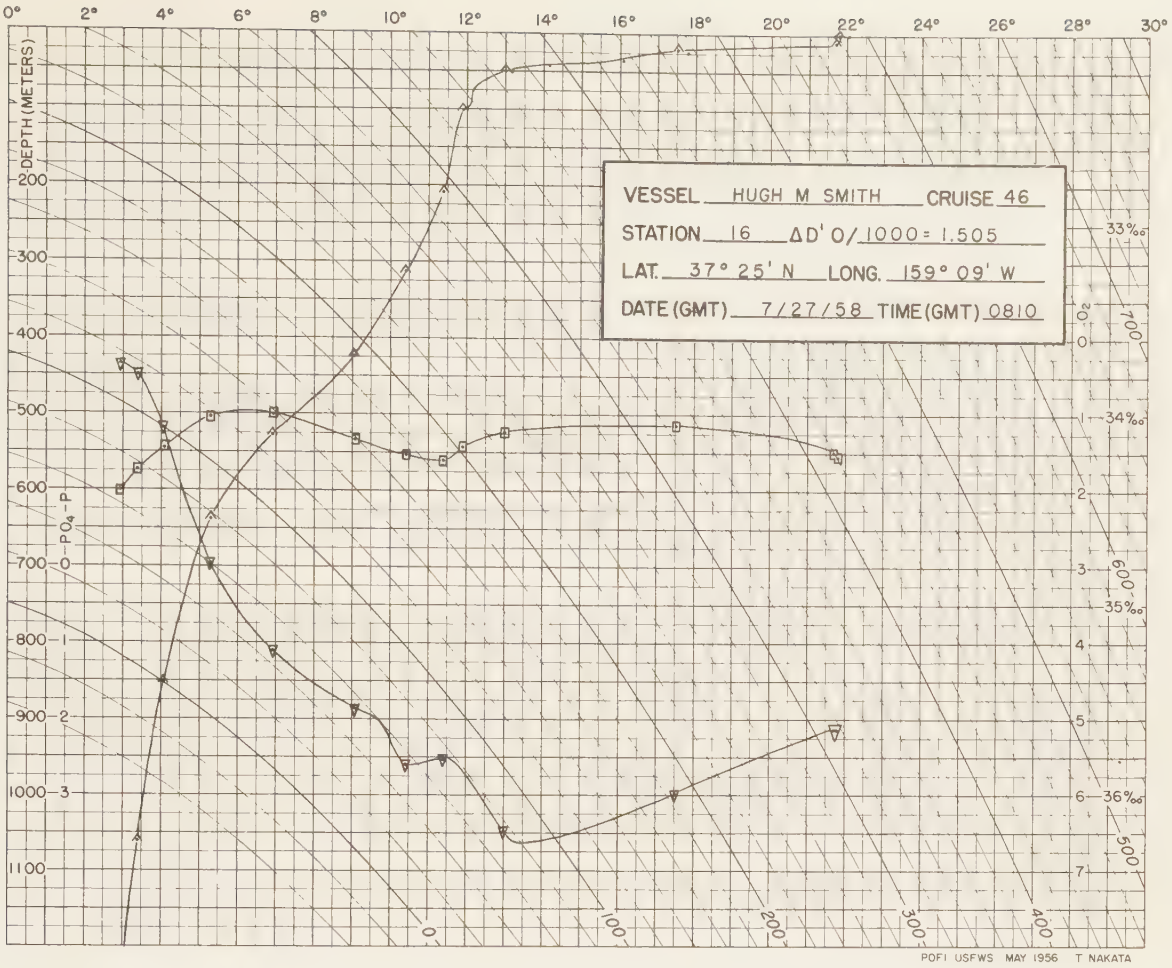
*Values of duplicate did not agree within 0.1 µg at./L. tolerance so both are carried.


VESSEL HUGH M SMITH CRUISE 46
STATION 14 ΔD' O/ 1000 = 1.472
LAT. 35° 44' N LONG. 158° 58' W
DATE (GMT) 7/26/58 TIME (GMT) 1939
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: 01, cloud coverage: 5. Wind: 020°, 11 kts. Sea: 5-8 ft. Wire angle: 06°.
BT slide: 42. Dry bulb: 75.0°F. Wet bulb: 70.4°F. Barometric pressure: 1015 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	22.78	34.32 2/	439.3	4.99	Trace
10	22.77	34.33	438.2	4.96	Trace
26	17.90	34.21	324.2	5.87	Trace
57	13.46	34.28 2/	224.4	6.47	0.32
114	12.28	34.30 2/	200.4	5.53	0.70
214	11.36	34.28	185.7	5.53	0.70
320	10.04	34.18	170.7	4.90	0.70
433	8.10	34.13 2/	144.9	4.54	1.16
543	6.20	34.00 2/	129.5	3.39	2.00
657	4.87	34.05 2/	110.6	2.18	2.20
879	3.87	34.21 2/	88.4	0.90	2.52
1091	3.26	34.36 2/	71.5	0.34	3.25
1303	2.89	34.46 2/	60.8	0.39	3.09

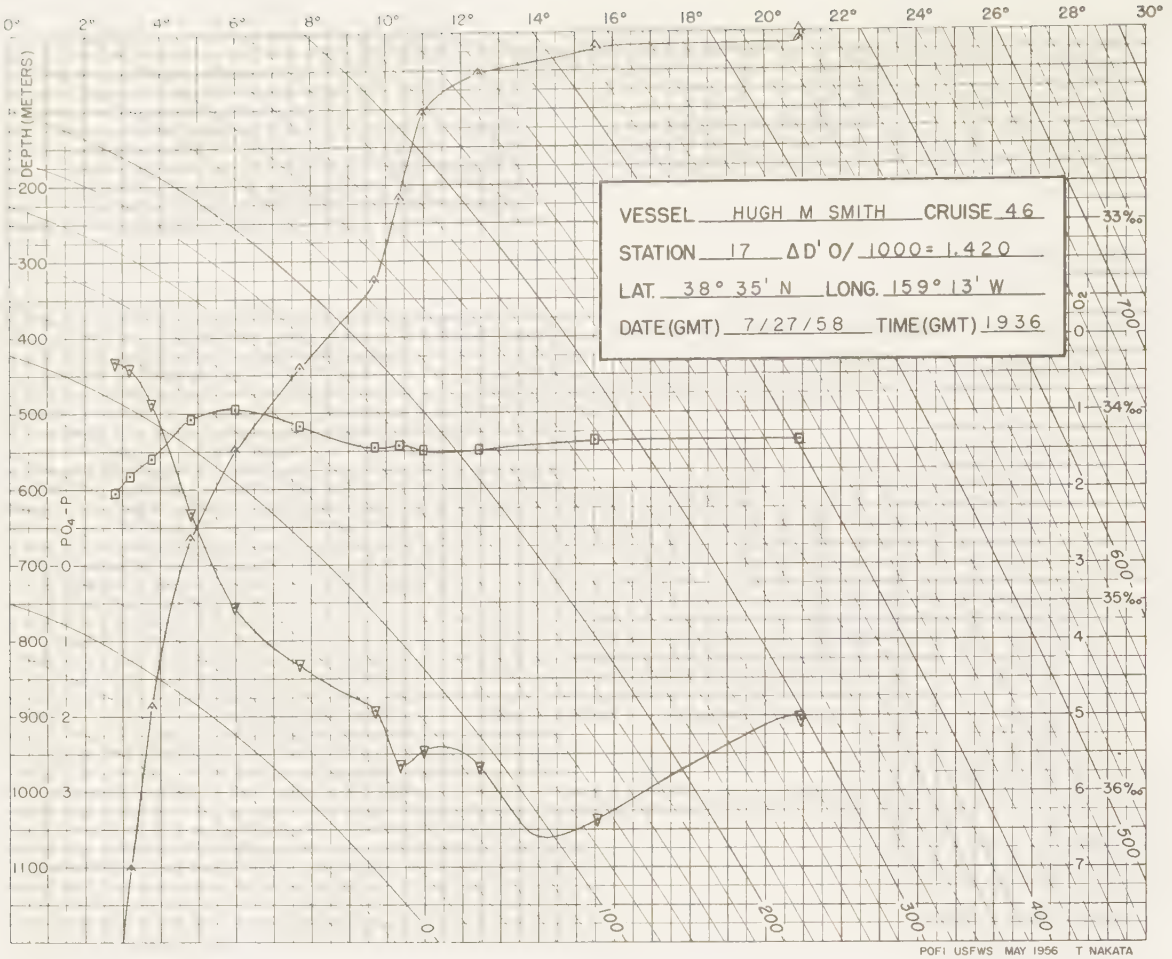
2/ Indicates H_2S precipitate in salinity sample.


VESSEL HUGH M SMITH CRUISE 46
STATION 16 ΔD' O/1000 = 1.505
LAT. 37° 25' N LONG. 159° 09' W
DATE (GMT) 7/27/58 TIME (GMT) 0810
DEPTH (METERS)
PO4-P
O2
POFI USFWS MAY 1956 T NAKATA

Weather: 01, cloud coverage: 7. Wind: 210°, 08 kts. Sea: 1-3 ft. Wire angle: 08°.
BT slide: 47. Dry bulb: 72.8°F. Wet bulb: 70.1°F. Barometric pressure: 1017 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	21.80	34.22 2/	420.4	5.13	Trace
10	21.72	34.20 2/	419.8	5.13	Trace
20	17.52	34.05	326.8	5.97	0.20
50	12.98	34.09 2/	229.0	6.47	0.20
101	11.90	34.17	203.2	NS	NS
209	11.39	34.24	189,2	5.52	0.54
313	10.41	34.21	174.7	5.59	0.91
423	9.06	34.13	159.1	4.85	1.16
527	6.92	34.00 2/	138.4	4.10	1.48
638	5.28	34.01 2/	118.1	2.95	1.91
852	4.06	34.18	92.4	1.18	2.82
1060	3.40	34.29	78.1	0.49	3.00
1270	2.94	34.40 2/	65.6	0.34	3.09

2/ Indicates H_2S precipitate in salinity sample.

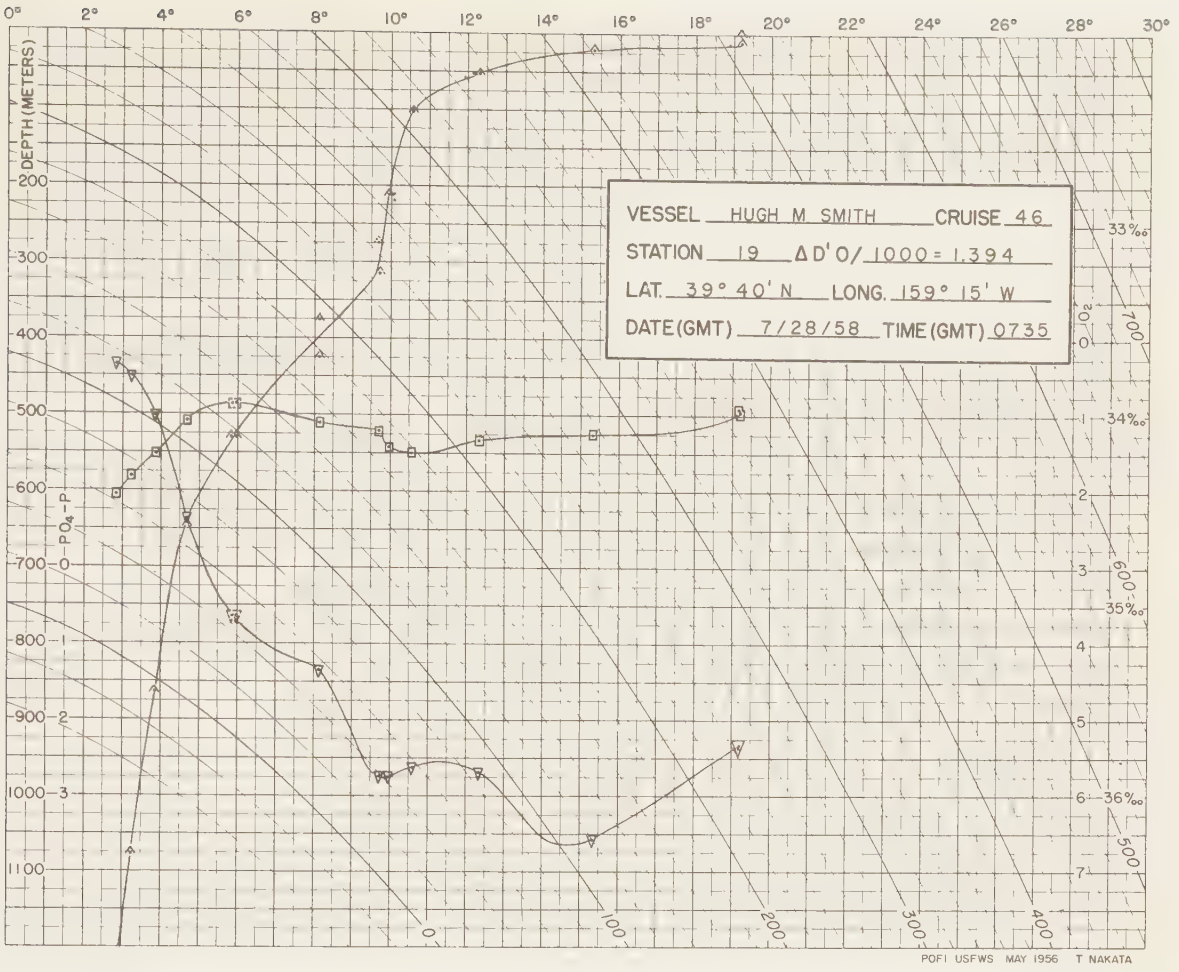

VESSEL HUGH M SMITH CRUISE 46
STATION 17 ΔD' O/ 1000= 1.420
LAT. 38° 35' N LONG. 159° 13' W
DATE(GMT) 7/27/58 TIME(GMT) 1936
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: 02, cloud coverage: 8. Wind: 250°, 14 kts. Sea: 1-3 ft. Wire angle: 00°.
BT slide: 51. Dry bulb: 69.5°F. Wet bulb: 65.9°F. Barometric pressure: 1021 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	20.94	34.14	403.8	5.06	Trace
11	20.93	34.14	403.7	5.01	Trace
21	15.55	34.15 2/	276.2	6.37	Trace
53	12.44	34.20	210.8	5.66	0.26
106	10.98	34.20	184.8	5.46	0.59
219	10.36	34.17	176.7	5.63	0.50
327	9.71	34.18 2/	165.5	4.91	1.00
441	7.69	34.07 2/	143.8	4.31	1.64
550	5.97	33.98	128.2	3.54	1.64
666	4.81	34.03 2/	111.4	2.30	2.20
887	3.76	34.24 2/	85.0	0.85	3.00
1102	3.20	34.33	73.2	0.41	3.00
1317	2.81	34.42	63.2	0.32	2.63*
					4.00

2/ Indicates H_2S precipitate in salinity sample.

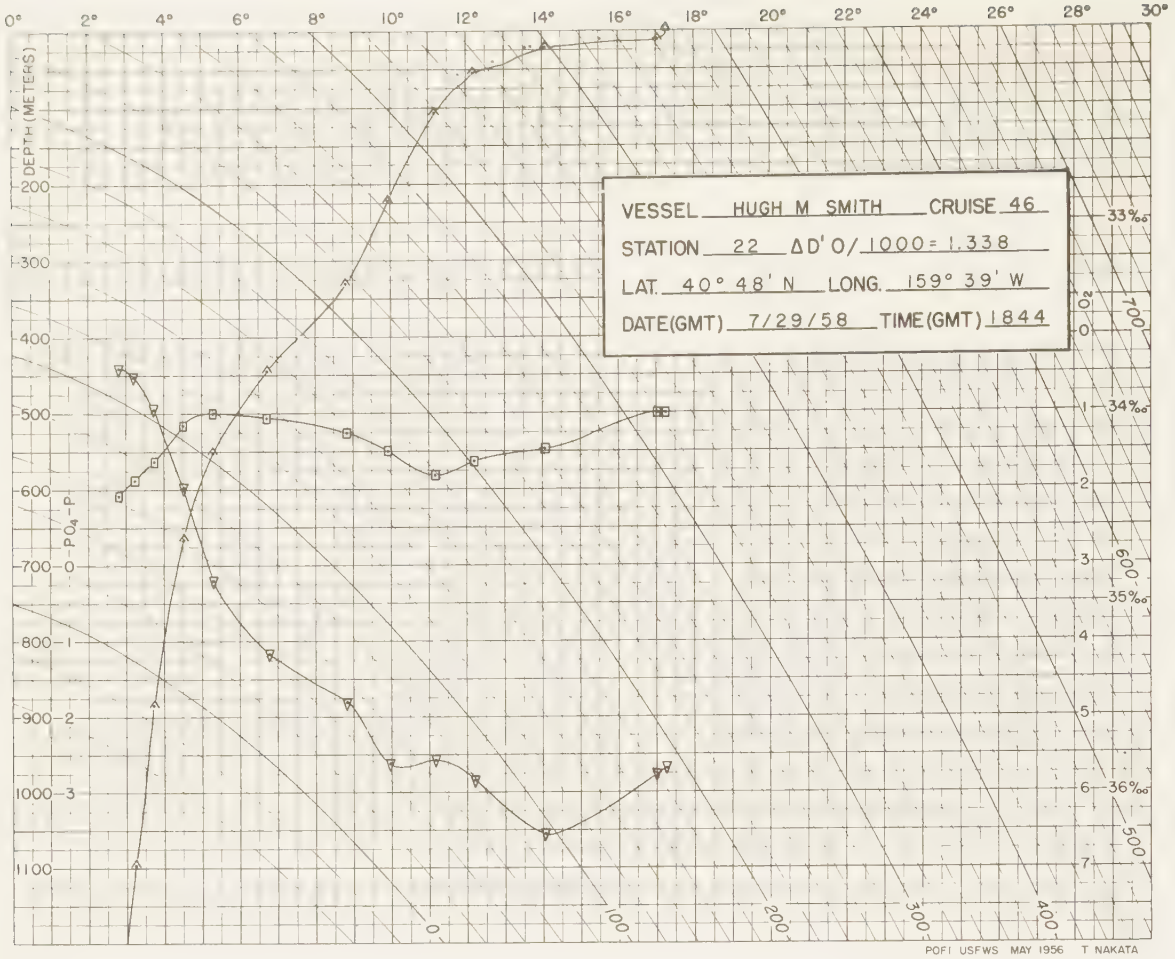
*Values of duplicate did not agree within 0.1 µg at./L. tolerance so both are carried.


VESSEL HUGH M SMITH CRUISE 46
STATION 19 ΔD' O/ 1000 = 1.394
LAT. 39° 40' N LONG. 159° 15' W
DATE (GMT) 7/28/58 TIME (GMT) 0735
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: 02, cloud coverage: not recorded. Wind: 300°, 14 kts. Sea: not recorded. Wire angle: 00°. BT slide: 55. Dry bulb: 67.9°F. Wet bulb: 64.2°F. Barometric pressure: 1022 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	19.18	33.96	373.0	5.36	0.32
11	19.20	33.98 2/	372.0	5.33	0.37
21	15.32	34.10 2/	275.0	6.58	0.37
52	12.33	34.13	213.9	5.69	0.54
103	10.59	34.20 2/	178.3	5.62	0.64
211	9.96	34.17 2/	170.1	5.75	0.70
274	9.72	34.08 Q	173.1	5.74	0.91
315					
376	8.14	34.04	152.2	4.34	1.73
424					
530	5.96	33.94	131.1	3.64	2.10
	5.85		129.8		
641	4.67	34.03 2/	110.0	2.35	2.92
863	3.85	34.21	88.2	1.01	2.92
1077	3.24	34.32	74.2	0.50	3.00
1292	2.84	34.42	63.4	0.34	3.09

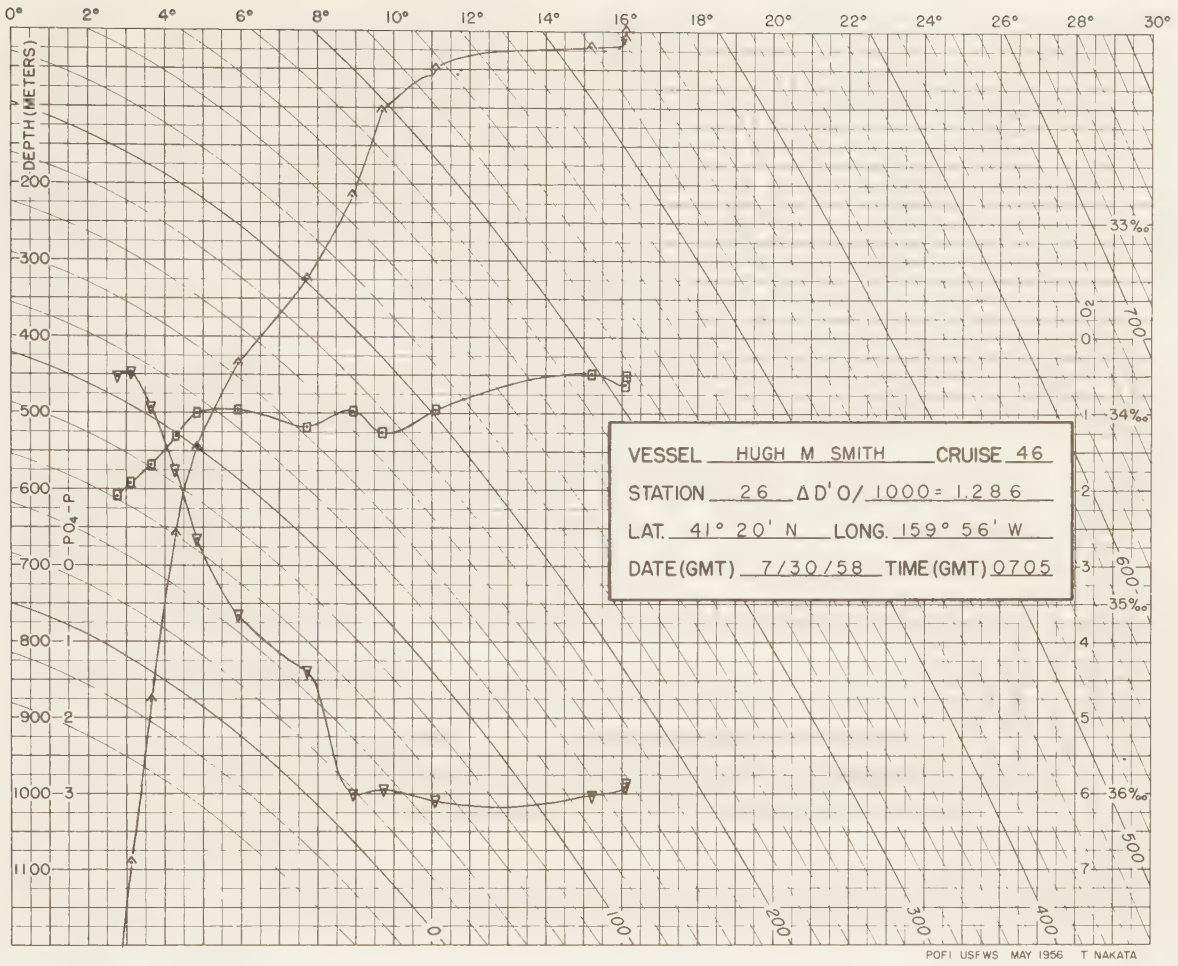
2/ Indicates H_2S precipitate in salinity sample.


VESSEL HUGH M SMITH CRUISE 46
STATION 22 ΔD' O/1000 = 1.338
LAT. 40° 48' N LONG. 159° 39' W
DATE(GMT) 7/29/58 TIME(GMT) 1844
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: 20, cloud coverage: 8. Wind: 010°, 08 kts. Sea: 1-3 ft. Wire angle: 01°.
BT slide: 64. Dry bulb: 62.7°F. Wet bulb: 60.3°F. Barometric pressure: 1027 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	17.26	34.00	324.5	5.68	0.12
11	17.02	34.00	319.1	5.75	0.20
22	14.06	34.19	242.6	6.55	0.12
54	12.20	34.25	202.5	5.83	0.32
108	11.18	34.32	179.6	5.57	0.54
222	9.94	34.20	167.6	5.61	0.46
330	8.83	34.10	157.8	4.80	0.91
444	6.76	34.02	134.9	4.16	1.73
552	5.29	34.00	118.9	3.19	1.73
665	4.52	34.06	106.2	1.97	2.30
884	3.74	34.25	84.0	0.94	3.00
1097	3.22	34.35	71.9	0.52	3.09
1313	2.80	34.43	62.2	0.40	3.40*
					1.91

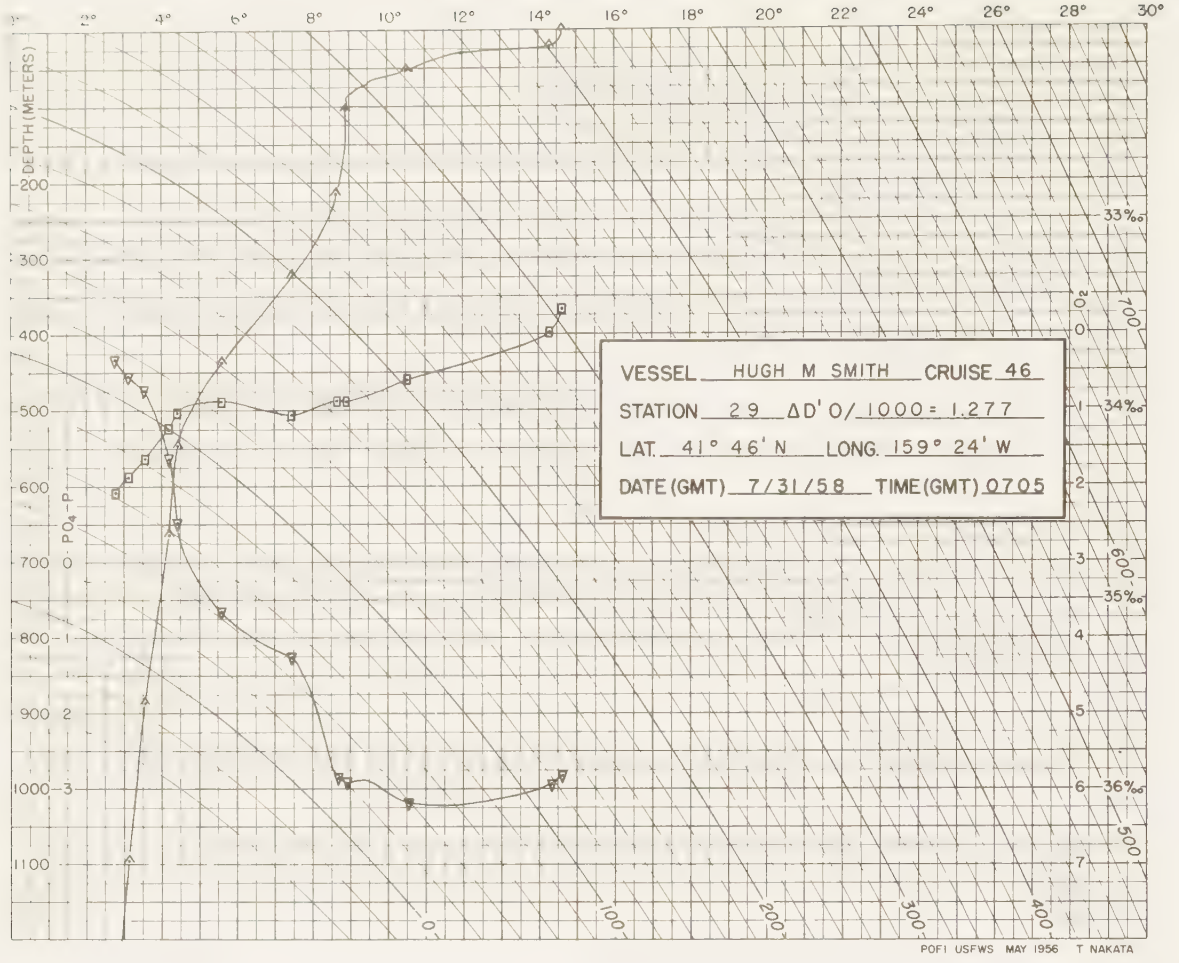
*Values of duplicate did not agree within 0.1 µg at./L. tolerance so both are carried.


VESSEL HUGH M SMITH CRUISE 46
STATION 26 ΔD'O/1000 = 1.286
LAT. 41° 20' N LONG. 159° 56' W
DATE (GMT) 7/30/58 TIME (GMT) 0705
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: 03, cloud coverage: 7. Wind: 350°, 08 kts. Sea: 1-3 ft. Wire angle: 00°.
BT slide: 68. Dry bulb: 61.0°F. Wet bulb: 56.0°F. Barometric pressure: 1030 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	16.12	33.80	314.0	5.86	0.42
10	16.08	33.85	309.6	5.91	0.42
21	15.20	33.79 2/	295.0	6.02	0.42
51	11.11	33.98	203.4	6.10	0.54
105	9.73	34.10	171.7	5.94	0.59
216	8.92	33.99	167.3	6.00	0.83
324	7.72	34.07	144.1	4.38	1.48
437	5.90	33.98 2/	127.4	3.64	2.10
547	4.84	34.00	113.9	2.64	2.20
659	4.29	34.12	99.4	1.74	2.30
878	3.64	34.27 2/	81.7	0.92	2.82
1091	3.12	34.37 2/	69.4	0.47	3.00
1303	2.78	34.44 2/	61.4	0.52	2.82

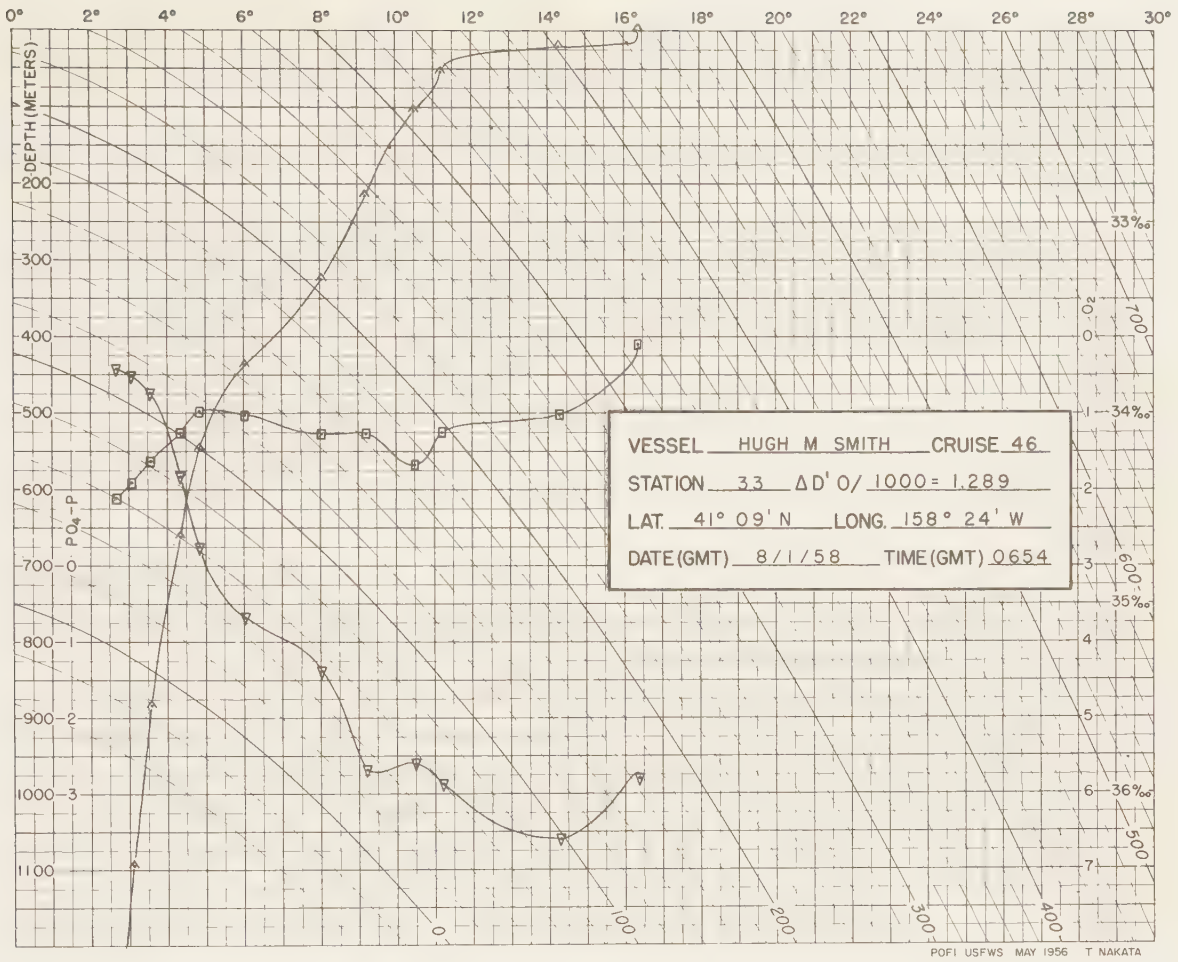
2/ Indicates H_2S precipitate in salinity sample.


VESSEL HUGH M SMITH CRUISE 46
STATION 29 ΔD' O/ 1000 = 1.277
LAT. 41° 46' N LONG. 159° 24' W
DATE (GMT) 7/31/58 TIME (GMT) 0705
DEPTH (METERS)
PO4-P
O2
POFI USFWS MAY 1956 T NAKATA

Weather: 02, cloud coverage: 9. Wind: 310°, 06 kts. Sea: 1-3 ft. Wire angle: 00°.
BT slide: 74. Dry bulb: 58.0°F. Wet bulb: 53.3°F. Barometric pressure: 1030 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	14.62	33.47	306.5	5.82	0.54
10	14.76 P	33.47 2/	309.3	5.74	0.46
21	14.30	33.59	291.3	5.93	0.54
52	10.54	33.84 2/	204.0	6.19	0.64
105	8.90	33.95	170.0	5.91	0.91
216	8.66	33.95	166.5	5.85	0.91
323	7.44	34.02 2/	144.1	4.25	1.64
437	5.60	33.95	126.2	3.65	1.82
547	4.42	34.01 2/	108.9	2.48	2.82
663	4.20	34.10 2/	99.9	1.63	2.92
886	3.56	34.25	82.6	0.73	3.17
1097	3.12	34.35	71.0	0.54	3.40
1288	2.78	34.43 2/	62.1	0.33	3.35
1305					

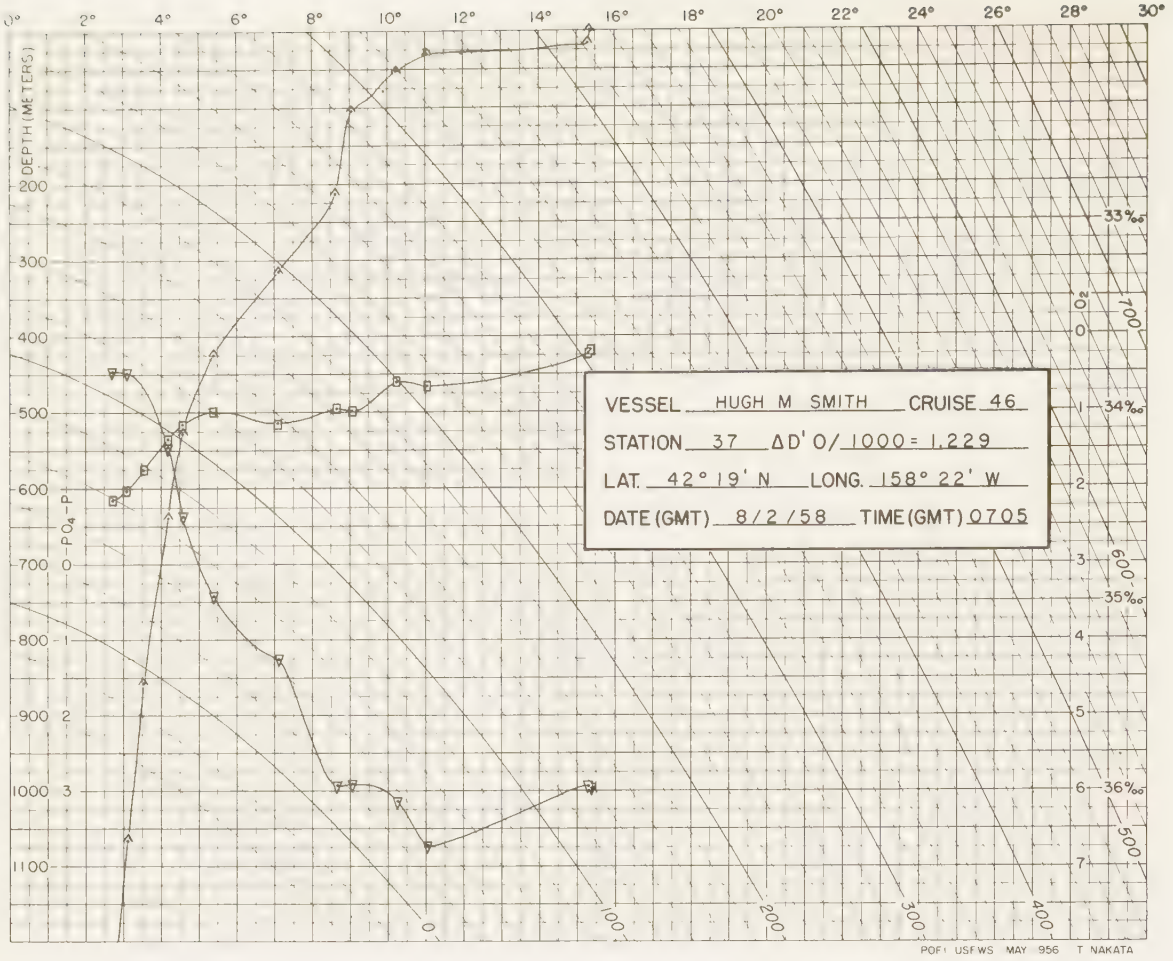
2/ Indicates H_2S precipitate in salinity sample.


VESSEL HUGH M SMITH CRUISE 46
STATION 33 ΔD' O/ 1000 = 1.289
LAT. 41° 09' N LONG. 158° 24' W
DATE (GMT) 8/1/58 TIME (GMT) 0654
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: 02, cloud coverage: 8. Wind: 000°, 07 kts. Sea: 1-3 ft. Wire angle: 04°.
BT slide: 81. Dry bulb: 57.2°F. Wet bulb: 53.9°F. Barometric pressure: 1030 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	16.38	33.64	331.4	5.79	0.42
11	16.41 P	33.66	330.5	5.73	0.26
21	14.28	34.01	260.3	6.60	0.32
53	11.22	34.10	196.4	5.87	0.54
106	10.50	34.27 2/	171.6	5.60	0.76
216	9.21	34.11 2/	162.9	5.68	0.50
324	8.02	34.11	145.2	4.37	1.08
437	6.01	34.01	126.4	3.67	1.91
546	4.84	33.99	114.9	2.74	2.42
661	4.35	34.10	101.4	1.82	2.00
882	3.58	34.25 2/	82.7	0.73	2.82
1094	3.08	34.36	69.9	0.51	2.63
1305	2.70	34.44 2/	60.7	0.42	3.32

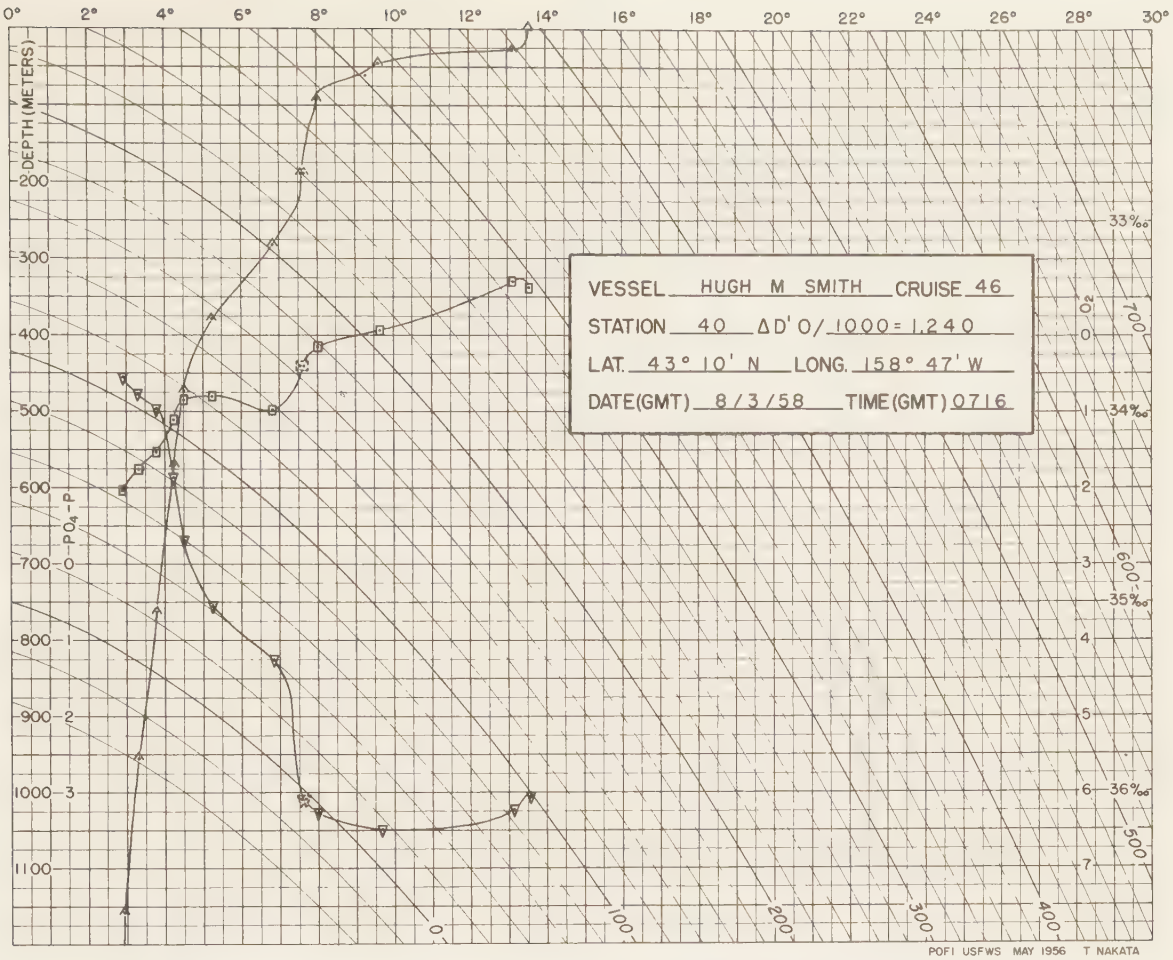
2/ Indicates H_2S precipitate in salinity sample.



Weather: 02, cloud coverage: not recorded. Wind: 350°, 08 kts. Sea: < 1 ft. Wire angle: 07°. BT slide: 89. Dry bulb: 54.5°F. Wet bulb: 52.2°F. Barometric pressure: 1032 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	15.36	33.67 2/	307.2	5.97	0.54
16	15.29	33.69	304.2	5.94	0.42
31	11.05	33.86 2/	211.0	6.72	0.54
52	10.24	33.84	199.1	6.13	0.64
103	9.05	33.99 2/	169.3	5.90	0.64
212	8.64	33.98 2/	164.0	5.92	0.12
315	7.08	34.05 2/	136.8	4.25	1.32
424	5.39	34.00 2/	120.1	3.42	2.52
529	4.58	34.06	106.8	2.37	2.92
639	4.19	34.14	96.7	1.45	2.92
857	3.55	34.30	78.7	1.66 P	2.92
1067	3.08	34.41 2/	66.1	0.48	3.25
1279	2.73	34.46	59.6	0.45	2.63

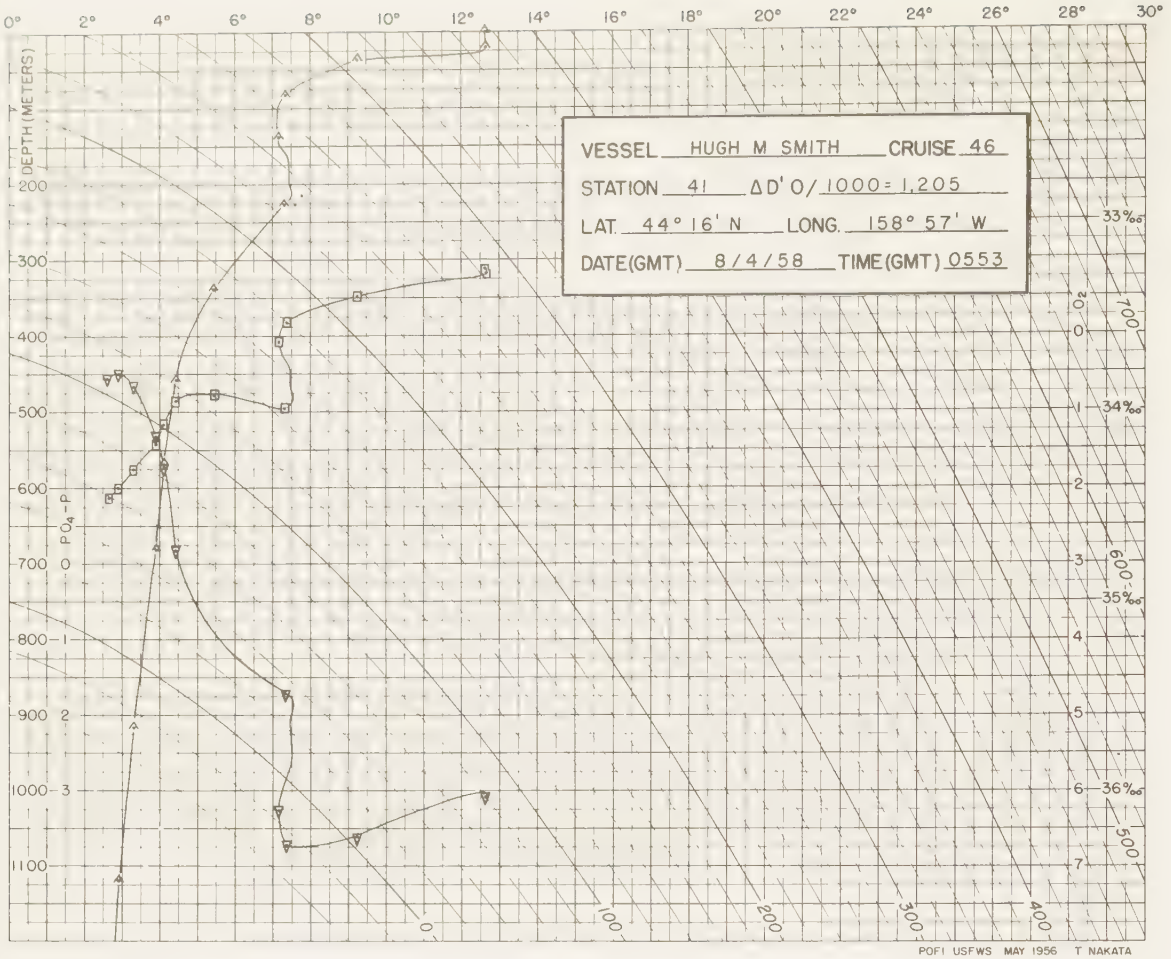
2/ Indicates H_2S precipitate in salinity sample.


VESSEL HUGH M SMITH CRUISE 46
STATION 40 ΔD' O/ 1000 = 1.240
LAT. 43° 10' N LONG. 158° 47' W
DATE(GMT) 8/3/58 TIME(GMT) 0716
DEPTH (METERS)
PO4-P
O2
POFI USFWS MAY 1956 T NAKATA

Weather: 02, cloud coverage: 8. Wind: 280°, 13 kts. Sea: 3-5 ft. Wire angle: 27°.
BT slide: 96. Dry bulb: 54.0°F. Wet bulb: 52.0°F. Barometric pressure: 1028 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	13.56	33.35	294.3	6.04	NG
14	13.60 P	33.30	298.8	6.02	0.83
28	13.13	33.32	288.2	6.22	1.00
46	9.65	33.57	209.8	6.49	1.00
92	7.99	33.66	178.3	6.27	1.08
189	7.64 7.56	33.76	166.2 165.0	6.08	1.08
281	6.82	33.99	138.2	4.24	2.00
378	5.25	33.92	124.5	3.54	3.09
472	4.50	33.94	115.0	2.69	3.40
570	4.22	34.04	104.6	1.85	3.56
762	3.78	34.21	87.6	0.95	3.72
955	3.30	34.30	76.4	0.77	4.10
1158	2.92	34.41 2/	64.7	0.54	3.90

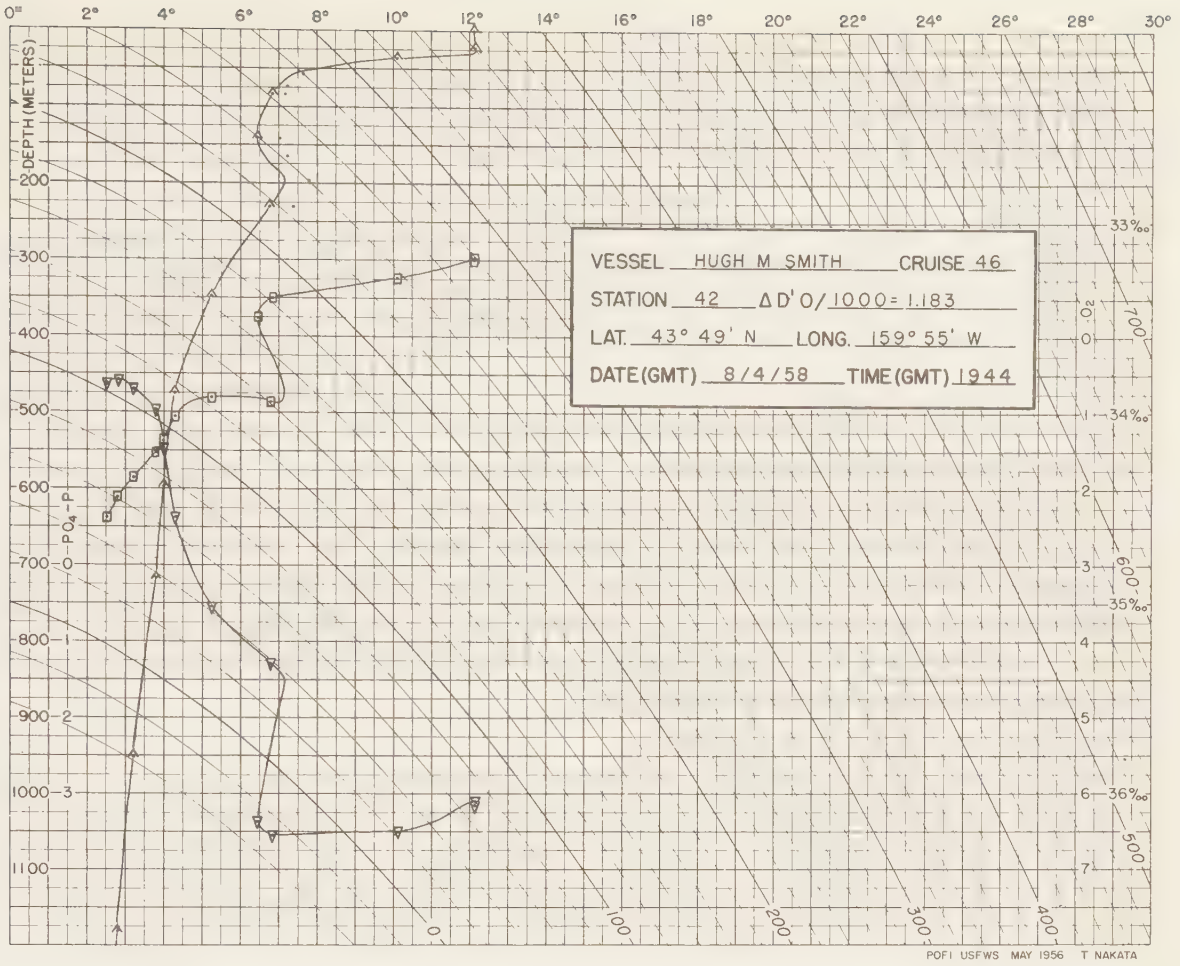
2/ Indicates H_2S precipitate in salinity sample.


VESSEL HUGH M SMITH CRUISE 46
STATION 41 ΔD' O/ 1000 = 1,205
LAT. 44° 16' N LONG. 158° 57' W
DATE(GMT) 8/4/58 TIME(GMT) 0553
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: 63, cloud coverage: 9. Wind: 250°, 25 kts. Sea: 8-12 ft. Wire angle: 21°.
BT slide: 102. Dry bulb: 55.6°F. Wet bulb: 54.7°F. Barometric pressure: 1020 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	12.62	33.25	283.9	6.09	0.54
20	12.64	33.27	282.8	6.63	0.64
36	9.23	33.39 2/	216.6	6.60	0.91
82	7.36	33.53	179.5	6.72	1.24
139	7.15	33.63	169.2	6.27	1.40
227	7.33	33.98	145.7	4.71	1.73
339	5.43	33.91	127.3	NS	2.52
457	4.43	33.94	114.5	2.82	2.73
569	4.11	34.06	102.0	1.72	3.40
682	3.89	34.17	91.6	1.32	3.40
917	3.31	34.30	76.5	0.66	3.40
1120	2.92	34.40	65.5	0.50	3.56
1328	2.65	34.45	59.6	0.56	3.48

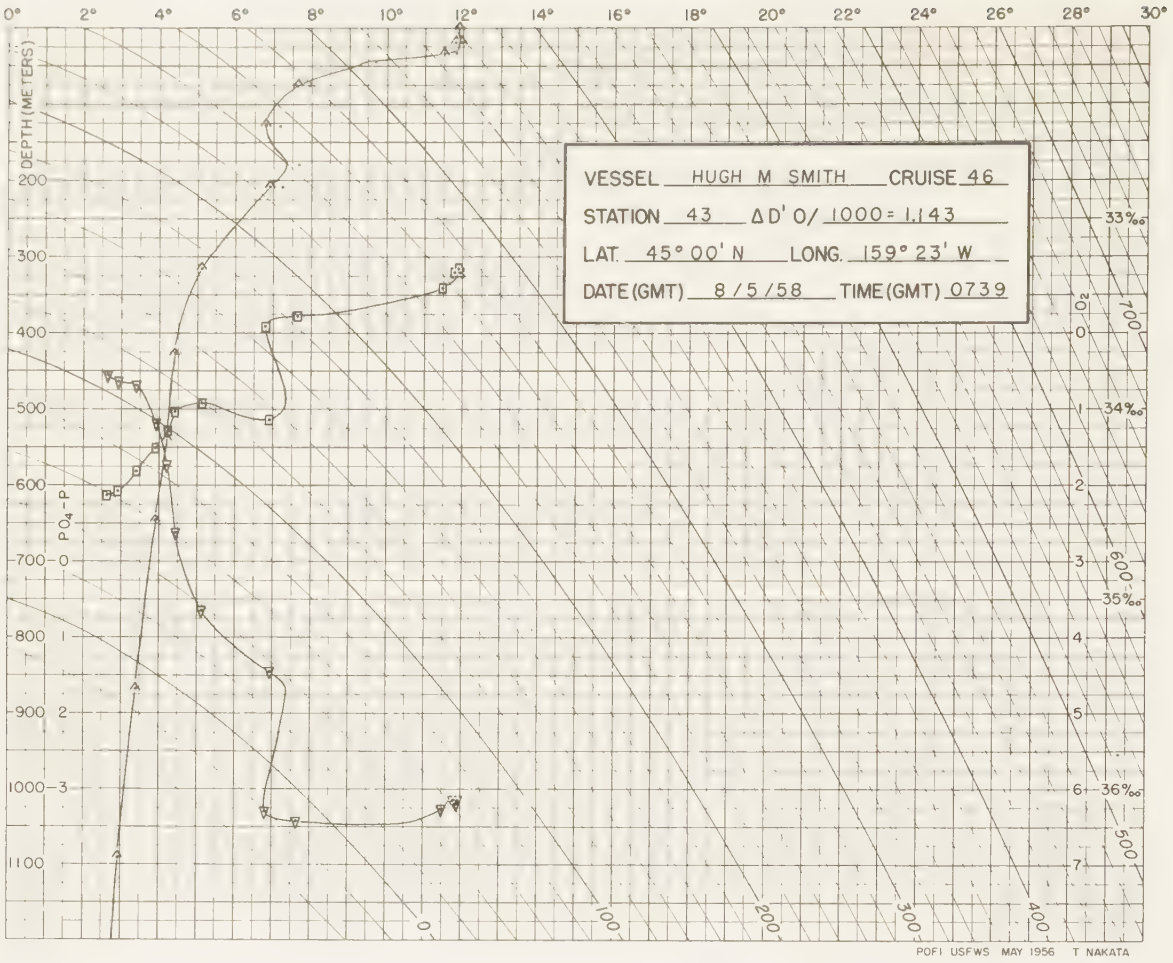
2/ Indicates H_2S precipitate in salinity sample.


VESSEL HUGH M SMITH CRUISE 46
STATION 42 Δ D' O/ 1000 = 1.183
LAT. 43° 49' N LONG. 159° 55' W
DATE (GMT) 8/4/58 TIME (GMT) 1944
DEPTH (METERS)
P O4 - P
POFI USFWS MAY 1956 T NAKATA

Weather: 02, cloud coverage: 9. Wind: 250°, 22 kts. Sea: 8-12 ft. Wire angle: 06°.
BT slide: 106. Dry bulb: 56.0°F. Wet bulb: 55.0°F. Barometric pressure: 1020 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	12.12	33.20 2/	278.4	6.14	0.83
21	12.15	33.19 2/	279.8	6.11	0.70
36	10.11	33.29 2/	237.9	6.50	0.70
83	6.82	33.40	182.0	6.54	1.00
141	6.44	33.50	169.9	6.36	1.00
230	6.78	33.94	141.3	4.29	1.48
348	5.23	33.92 2/	124.3	3.53	2.20
475	4.28	34.02 2/	106.7	2.37	2.63
596	3.98	34.15 2/	94.0	1.46	2.42
717	3.78	34.21	87.6	0.96	3.00
952	3.20	34.34	72.5	0.69	3.17
1181	2.80	34.44 2/	61.5	0.57	3.17
1394	2.53	34.55 2/	51.1	0.61	3.00

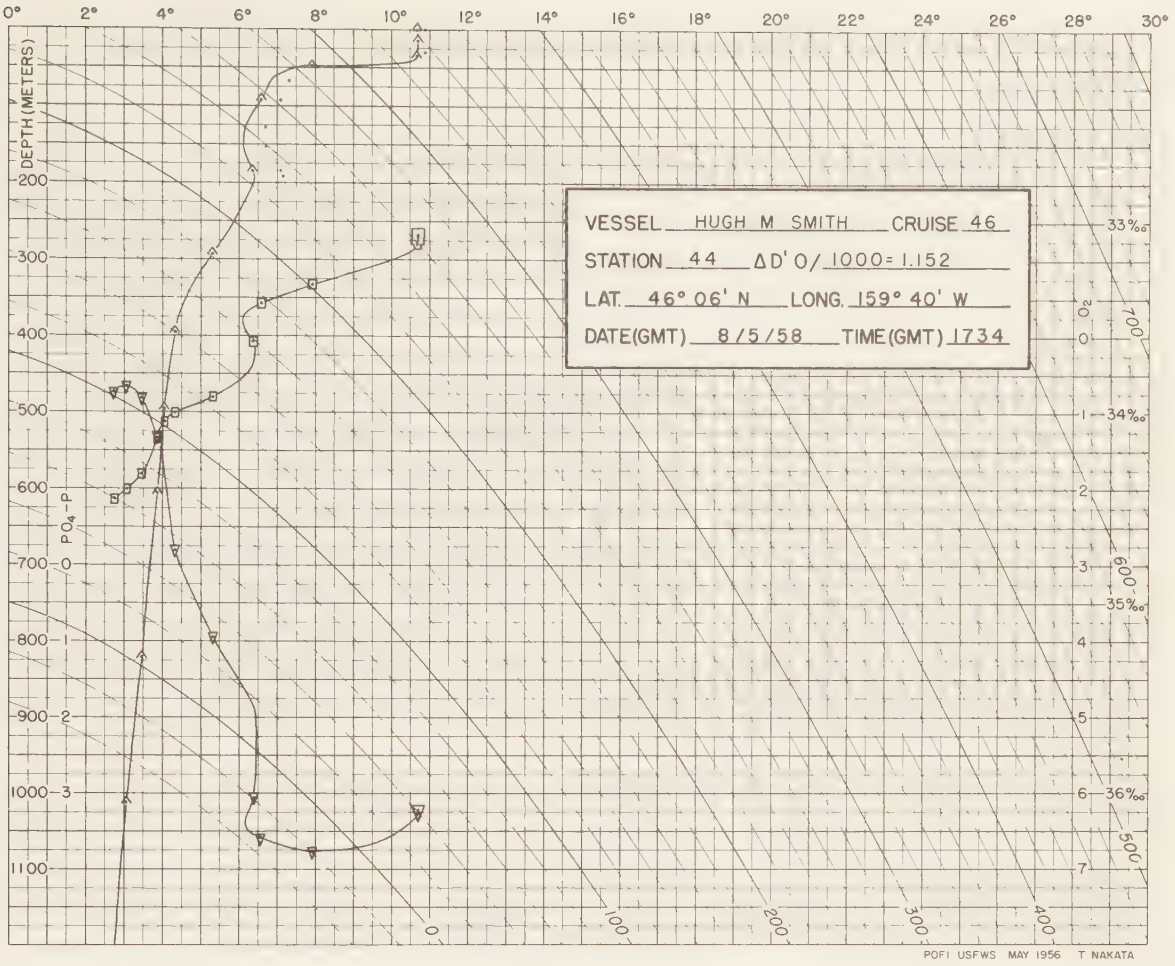
2/ Indicates H_2S precipitate in salinity sample.


VESSEL HUGH M SMITH CRUISE 46
STATION 43 ΔD' O/ 1000 = 1.143
LAT. 45° 00' N LONG. 159° 23' W
DATE (GMT) 8/5/58 TIME (GMT) 0739
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: 51, cloud coverage: 8. Wind: 290°, 17 kts. Sea: 8-12 ft. Wire angle: 25°.
BT slide: 111. Dry bulb: 53.3°F. Wet bulb: 51.5°F. Barometric pressure: 1018 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	11.87	33.26	269.5	6.19	0.50
19	11.79 P 11.92 P	33.28	266.7 268.9	6.14	0.42
33	11.46	33.36 2/	254.9	6.27	0.42
76	7.62	33.51 2/	184.5	6.42	1.00
128	6.80	33.56	170.0	6.28	0.70 Q
209	6.90	34.05	134.4	4.44	1.64
315	5.13	33.97 2/	119.4	3.65	1.64
426	4.42	34.01 2/	108.9	2.61	2.20
534	4.22	34.11 2/	99.4	1.73	2.63
645	3.93	34.20	89.7	1.18	3.00
868	3.40	34.32 2/	75.8	0.68	3.00
1091	2.94	34.43 2/	63.4	0.63	3.17
1302	2.64	34.45 2/	59.5	0.54	3.09

2/ Indicates H_2S precipitate in salinity sample.

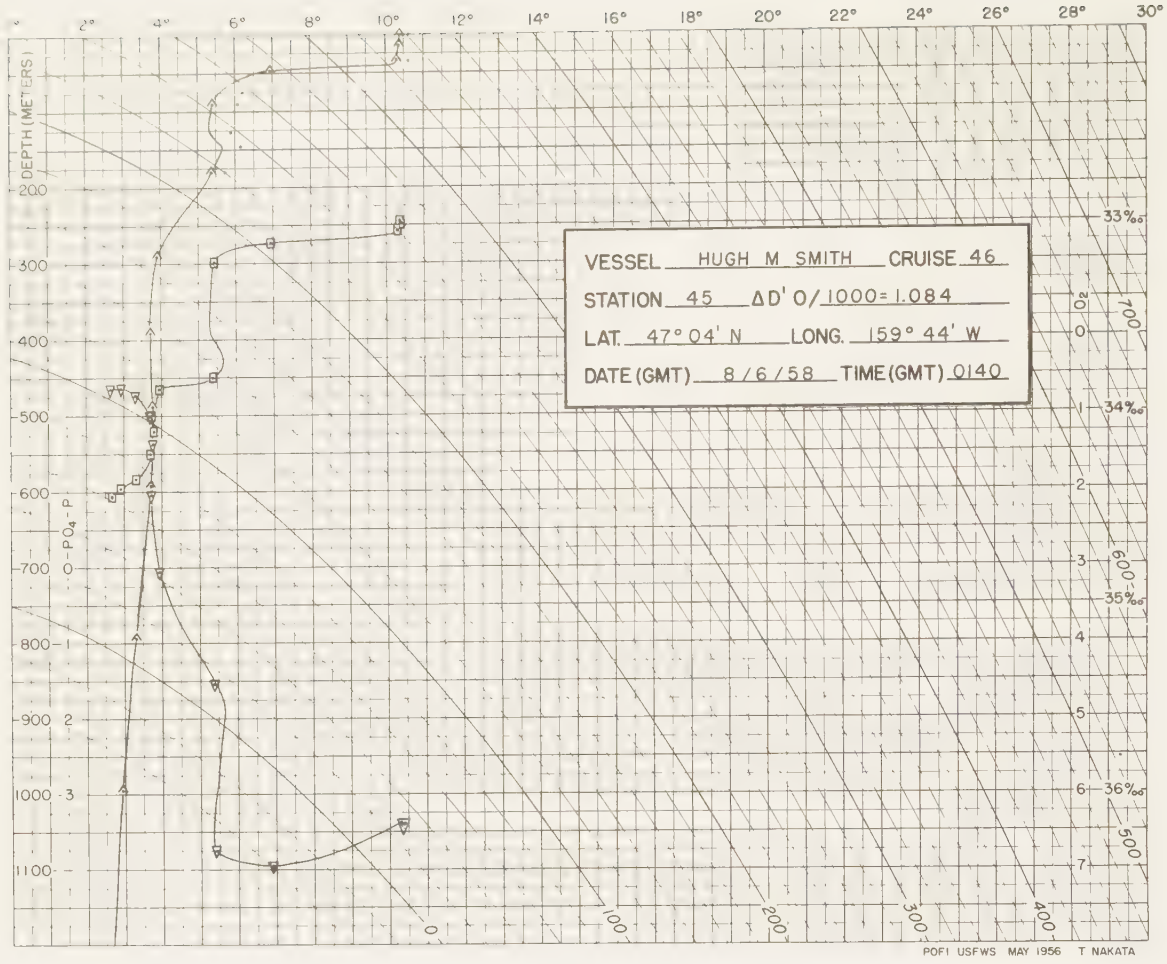

VESSEL HUGH M SMITH CRUISE 46
STATION 44 ΔD' O/ 1000 = 1.152
LAT. 46° 06' N LONG. 159° 40' W
DATE(GMT) 8/5/58 TIME(GMT) 1734
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: 02, cloud coverage: 8. Wind: 290°, 19 kts. Sea: 3-5 ft. Wire angle: 23°.
BT slide: 116. Dry bulb: 51.9°F. Wet bulb: 50.0°F. Barometric pressure: 1022 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	10.68	33.07 2/	263.0	6.25	0.83
14	10.70	33.08	262.6	6.22	0.70
34	10.68	33.11	260.0	6.26	0.59
48	7.90	33.33 2/	201.7	6.77	0.59
92	6.57	33.43	176.8	6.58	0.76
184	6.38	33.63 2/	159.4	6.04 Q	0.50
293	5.33	33.92 2/	125.3	3.94	1.64
396	4.34	34.00 2/	108.7	2.80	2.41
496	4.03	34.05 2/	102.0	0.22 P	2.82
604	3.84	34.13	94.2	1.32	2.00
820	3.45	34.32 2/	76.3	0.81	2.82
1011	3.04	34.40	66.5	0.66	3.32
1211	2.74	34.45 2/	60.3	0.72	3.17*
					2.63

2/ Indicates H_2S precipitate in salinity sample.

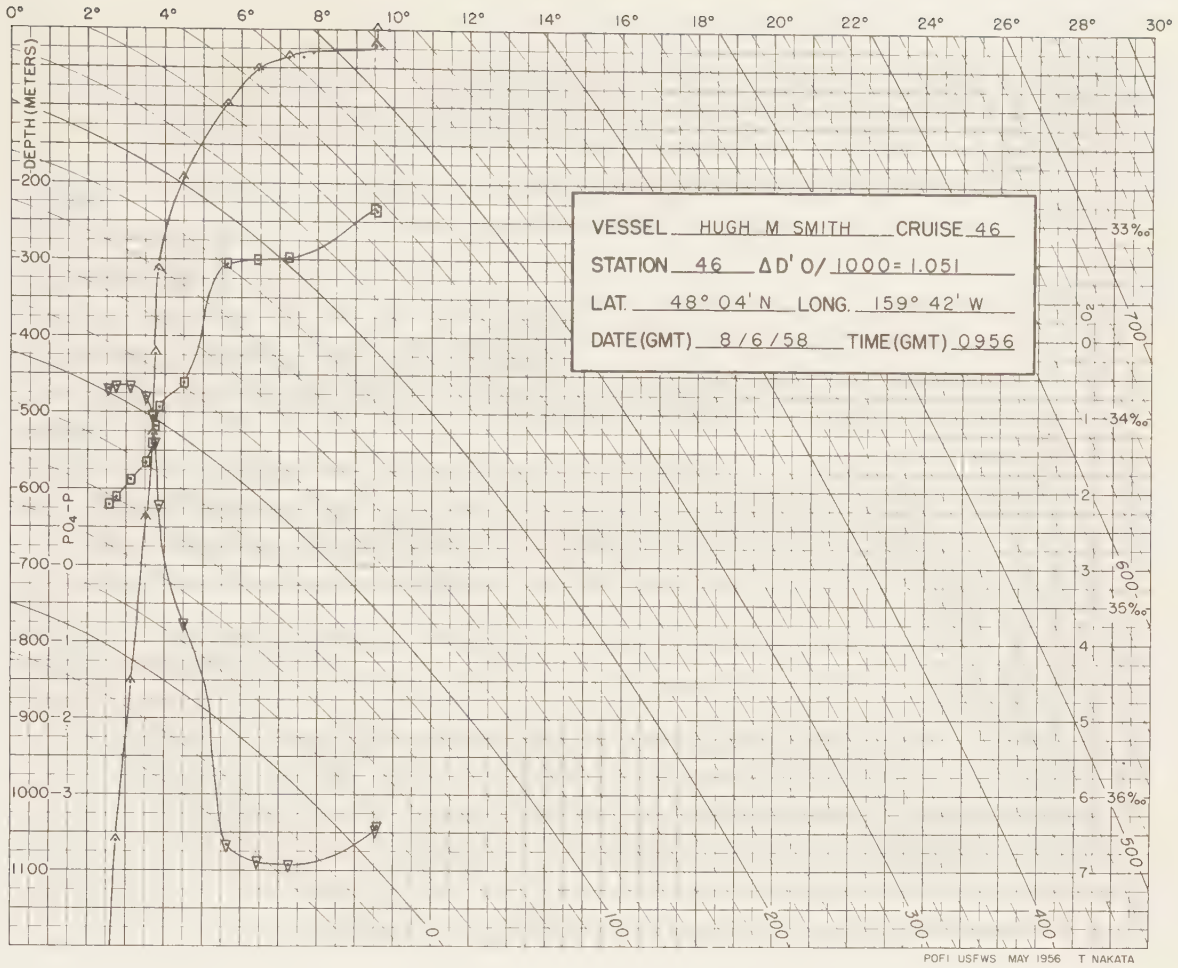
*Values of duplicate did not agree within 0.1 µg at./L. tolerance so both are carried.


VESSEL HUGH M SMITH CRUISE 46
STATION 45 ΔD' O/1000=1.084
LAT. 47° 04' N LONG. 159° 44' W
DATE (GMT) 8/6/58 TIME (GMT) 0140
DEPTH (METERS)
PO4-P
POF1 USFWS MAY 1956 T NAKATA

Weather: 03, cloud coverage: 8. Wind: 300°, 12 kts. Sea: 3-5 ft. Wire angle: 23°.
BT slide: 122. Dry bulb: 52.0°F. Wet bulb: 50.0°F. Barometric pressure: 1024 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	10.40	32.99 2/	264.5	6.39	1.48
14	10.36	32.98	264.5	6.40	1.00
33	10.30	33.03	259.9	6.38	0.83
47	6.91	33.09 2/	206.3	6.94	1.48
90	5.41	33.19 2/	180.8	6.75	1.48
180	5.38	33.80 2/	134.9	4.51	1.82
290	3.94	33.86 2/	115.4	3.04	2.82
391	3.72	34.00 2/	102.7	2.03	2.63
488	3.78	34.08	97.3	1.37	2.82
591	3.70	34.20 2/	87.6	1.00	3.32
794	3.32	34.33	74.3	0.72	3.00
994	2.93	34.38	67.1	0.63	3.17
1202	2.66	34.42	61.8	0.64	3.32

2/ Indicates H_2S precipitate in salinity sample.

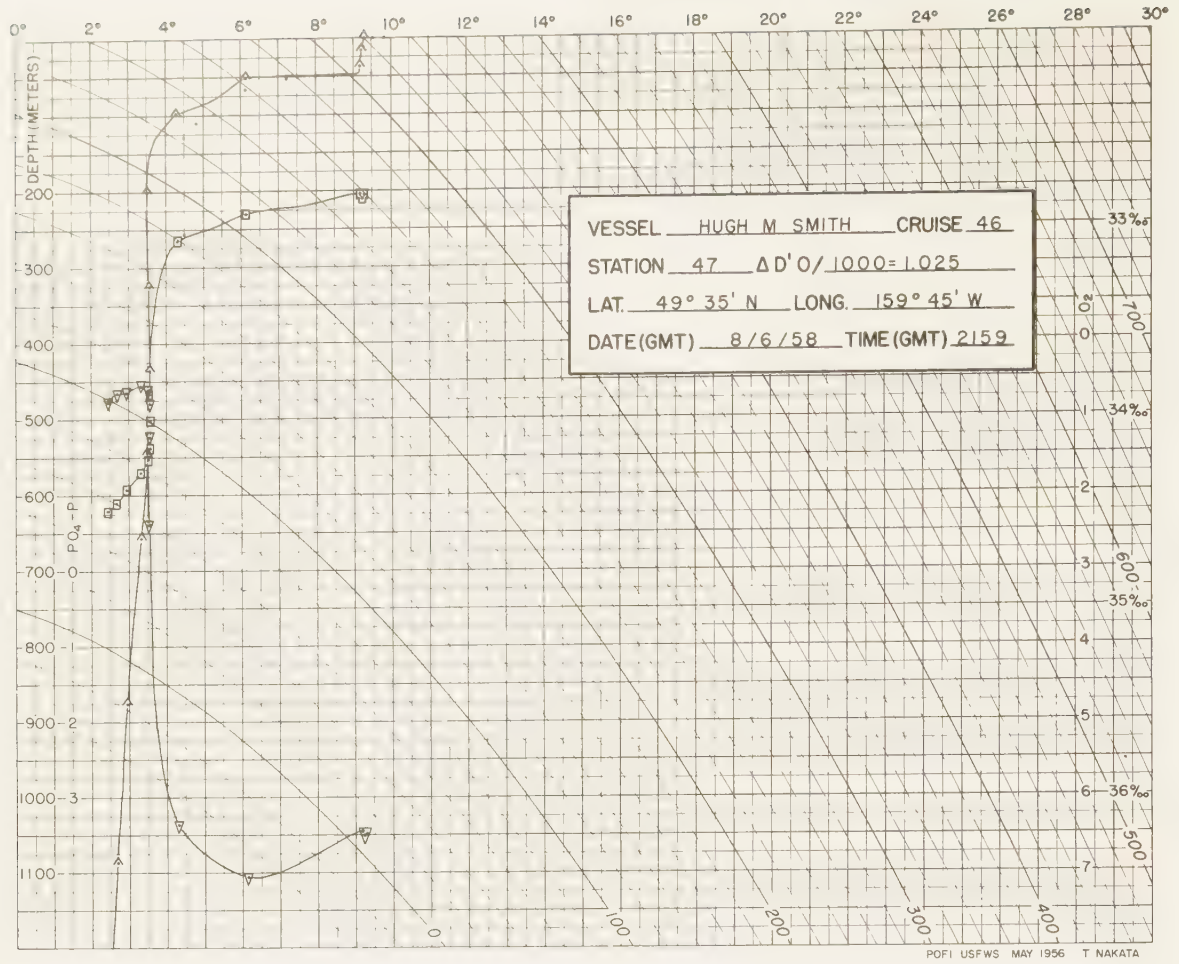

VESSEL HUGH M SMITH CRUISE 46
STATION 46 Δ D' O/ 1000 = 1.051
LAT. 48° 04' N LONG. 159° 42' W
DATE (GMT) 8/6/58 TIME (GMT) 0956
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: 02, cloud coverage: 8. Wind: 280°, 13 kts. Sea: 1-3 ft. Wire angle: 12°.
BT slide: 127. Dry bulb: 50.5°F. Wet bulb: 49.4°F. Barometric pressure: 25 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	9.57	32.94	255.0	6.41	1.16
20	9.54	32.93	255.3	6.45	1.00
36	7.24	33.19	203.0	6.92	1.24
51	6.42	33.20	192.0	6.89	1.16
97	5.63	33.22	181.1	6.65	1.00
194	4.51	33.84	122.7	3.74	2.42
313	3.84	33.97	106.1	2.20	3.09
423	3.76	34.07 2/	97.9	1.40	3.40
528	3.68	34.16	90.4	1.01	2.42
638	3.52	34.26	81.5	0.79	3.17
853	3.12	34.35	71.0	0.65	3.17
1061	2.76	34.44	61.1	0.65	3.32
1271	2.56	34.48	56.6	0.69	3.48* 2.82

2/ Indicates H_2S precipitate in salinity sample.

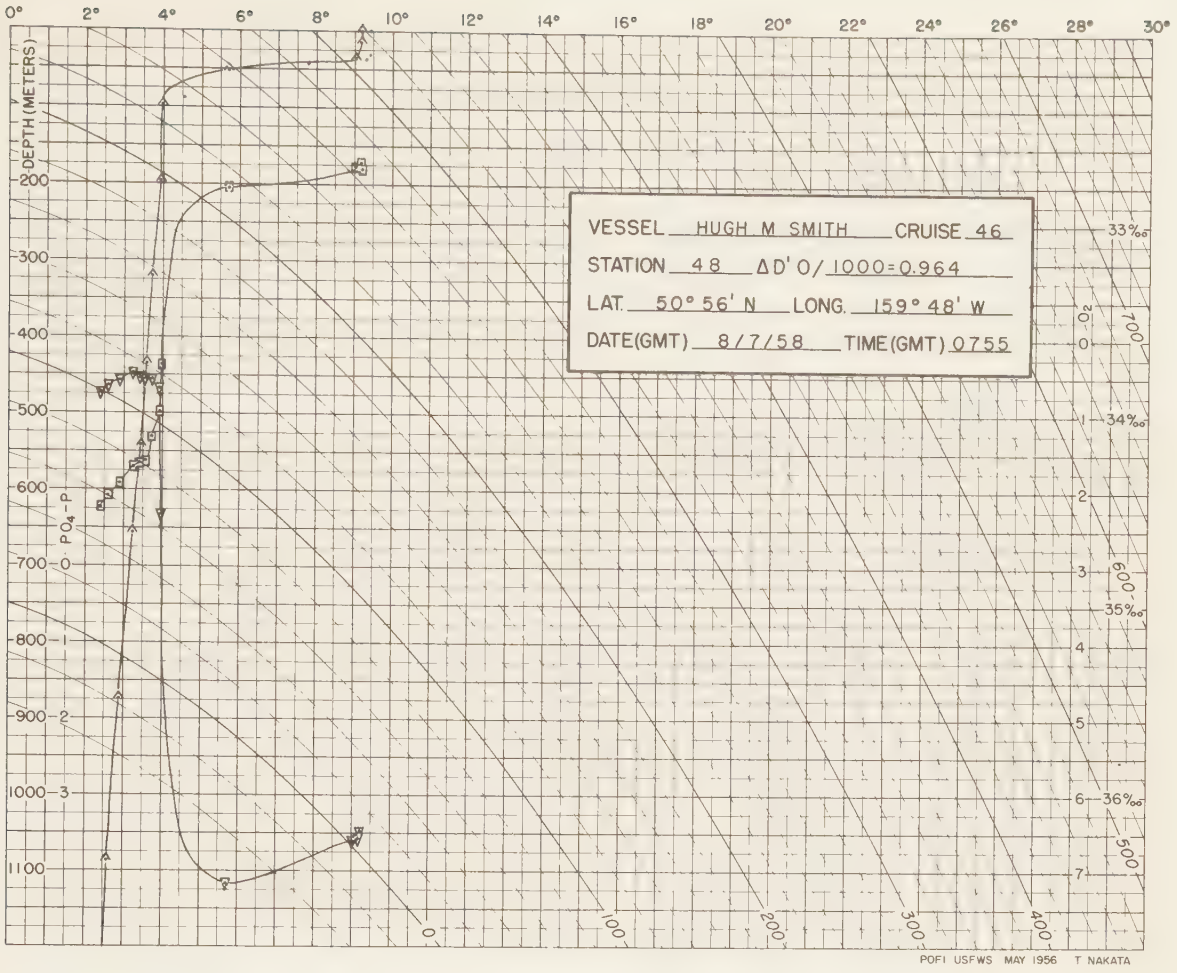
*Values of duplicate did not agree within 0.1 µg at./L. tolerance so both are carried.


VESSEL HUGH M SMITH CRUISE 46
STATION 47 Δ D' O/ 1000 = 1.025
LAT. 49° 35' N LONG. 159° 45' W
DATE (GMT) 8/6/58 TIME (GMT) 2159
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: 02, cloud coverage: 8. Wind: 280°, 10 kts. Sea: 1-3 ft. Wire angle: 05°.
BT slide: 131. Dry bulb: 51.0°F. Wet bulb: 49.0°F. Barometric pressure: 1025 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO4-P, µg at./L.
0	9.28	32.82	259.7	6.48	1.82
16	9.22	32.84	257.2	6.50	1.82
37	9.17	32.82 2/	257.9	6.45	1.40
52	6.14	32.92	209.9	7.05	1.48
99	4.29	33.06	179.1	6.35	2.00
200	3.54	33.87 2/	110.8	2.39	3.32
324	3.57	34.01	100.7	1.24	3.81
437	3.58	34.15	90.3	0.79	4.00
544	3.49	34.21	84.9	0.61	3.40
657	3.33	34.28	78.2	0.56	3.25
876	2.95	34.37	68.0	0.63	3.64
1087	2.68	34.44	60.6	0.65	4.25
1297	2.44	34.48	55.6	0.77	3.72

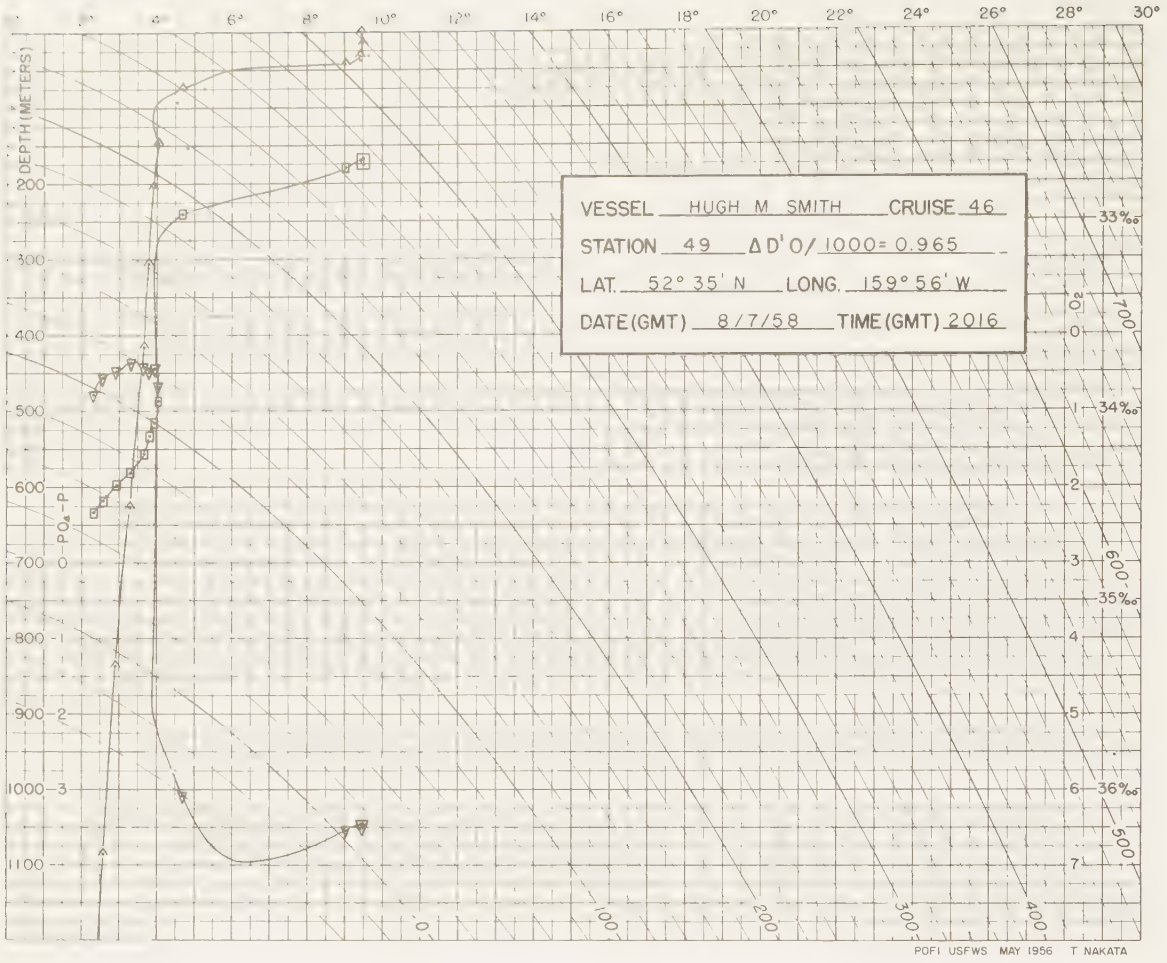
2/ Indicates H_2S precipitate in salinity sample.



Weather: 02, cloud coverage: 8. Wind: 320°, 14 kts. Sea: 1-3 ft. Wire angle: 07°.
BT slide: 134. Dry bulb: 49.9°F. Wet bulb: 47.4°F. Barometric pressure: 1028 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	9.20	32.72	265.9	6.47	1.64
15	9.18	32.69	267.8	6.56	1.16
36	9.03	32.71	264.1	6.60	1.48
51	5.69	32.82	211.8	7.16	1.32
98	3.98	33.74 2/	124.9	2.30	2.42
197	3.92	33.99	105.3	0.66	3.00
320	3.72	34.12	93.8	0.53	3.48
433	3.58	34.25 2/	82.7	0.53	3.81
541	3.42	34.26	80.5	0.53	3.25
654	3.24	34.28	77.4	0.47	3.32
874	2.87	34.36	68.1	0.57	3.48
1086	2.60	34.43	60.6	0.63	3.40
1301	2.40	34.49	54.5	0.73	3.56

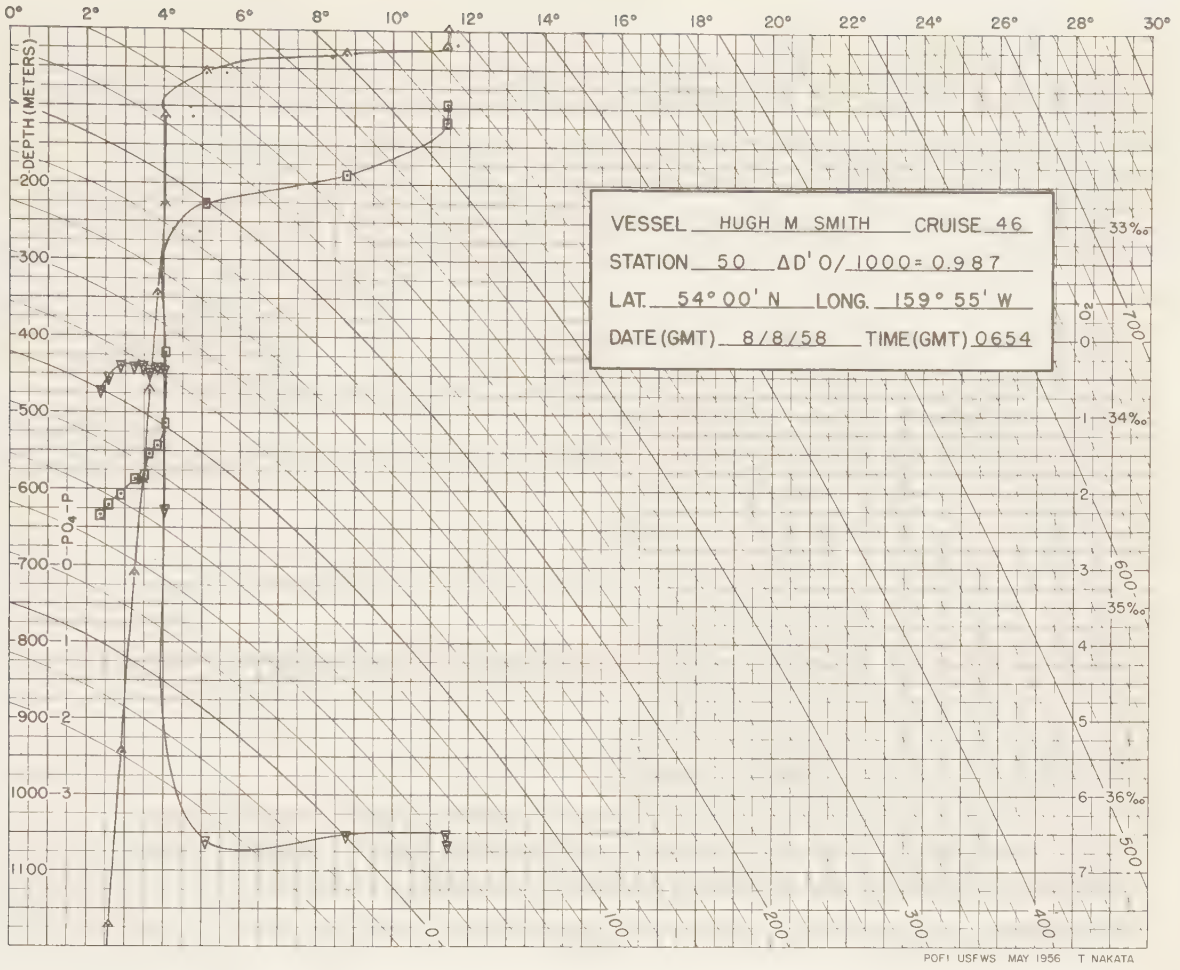
2/ Indicates H_2S precipitate in salinity sample.


VESSEL HUGH M SMITH CRUISE 46
STATION 49 Δ D' O/ 1000= 0.965
LAT. 52° 35' N LONG. 159° 56' W
DATE(GMT) 8/7/58 TIME(GMT) 2016
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: O2, cloud coverage: 8. Wind: 320°, 20 kts. Sea: 5-8 ft. Wire angle: 1st cast 27°, 2nd cast 31°. BT slide: 1st cast 138, 2nd cast 139. Dry blub: 1st cast 50.6°F, 2nd cast 50.3°F. Wet blub: 1st cast 49.7°F, 2nd cast 48.9°F. Barometric pressure: 1028 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	9.48	32.67	273.7	6.47	0.83
14	9.48	32.70	271.4	6.46	0.64
32	9.42	32.68	272.0	6.46	0.70
42	9.02	32.72 2/	263.2	6.53	0.70
74	4.70	32.96 2/	190.8	6.09	1.64
148	4.02	33.94	110.2	0.68	2.63
204	3.93	34.06	100.3	0.44	3.64
306	3.79	34.13	93.7	0.48	3.48
415	2.64	34.22 2/	85.5	0.41	3.48
625	3.28	34.32 2/	74.7	0.36	3.64
836	2.93	34.39	66.4	0.48	3.64
1086	2.58	34.47	57.5	0.54	3.48
1302	2.34	34.53 2/	51.0	0.78	3.35

2/ Indicates H_2S precipitate in salinity sample.

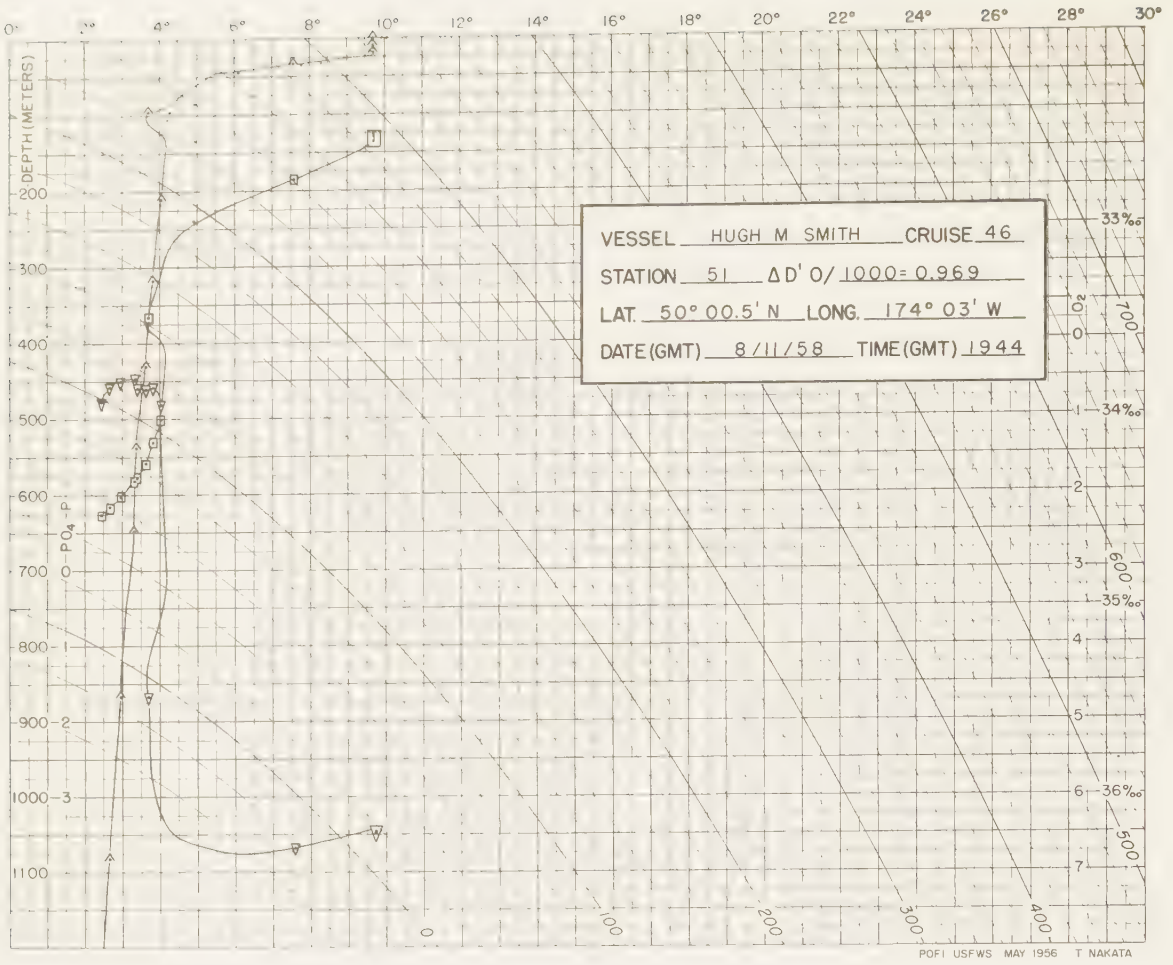


Weather: 02, cloud coverage: 8. Wind: 290°, 14 kts. Sea: 3-5 ft. Wire angle: 07°.
BT slide: 142. Dry bulb: 52.8°F. Wet bulb: 50.7°F. Barometric pressure: 1025 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	11.43	32.38 2/	326.9	6.65	0.32
21	11.41	32.48 2/	319.0	6.52	0.42
31	8.80	32.75 2/	257.7	6.53	1.48
57	5.11	32.91	198.8	6.60	1.91
114	4.04	33.69 2/	129.2	2.26	3.17
229	4.02	34.05 2/	101.8	0.44	3.32
346	3.83	34.17 2/	91.1	0.40	3.00
471	3.63	34.21 2/	86.2	0.48	3.09
591	3.46	34.32 2/	76.4	0.40	2.62
711	3.24	34.34	72.8	0.39	3.32
944	2.90	34.42 2/	63.8	0.39	3.81
1172	2.58	34.48	56.7	0.53	3.48
1384	2.37	34.53 2/	51.2	0.71	3.00* 3.81

2/ Indicates H_2S precipitate in salinity sample.

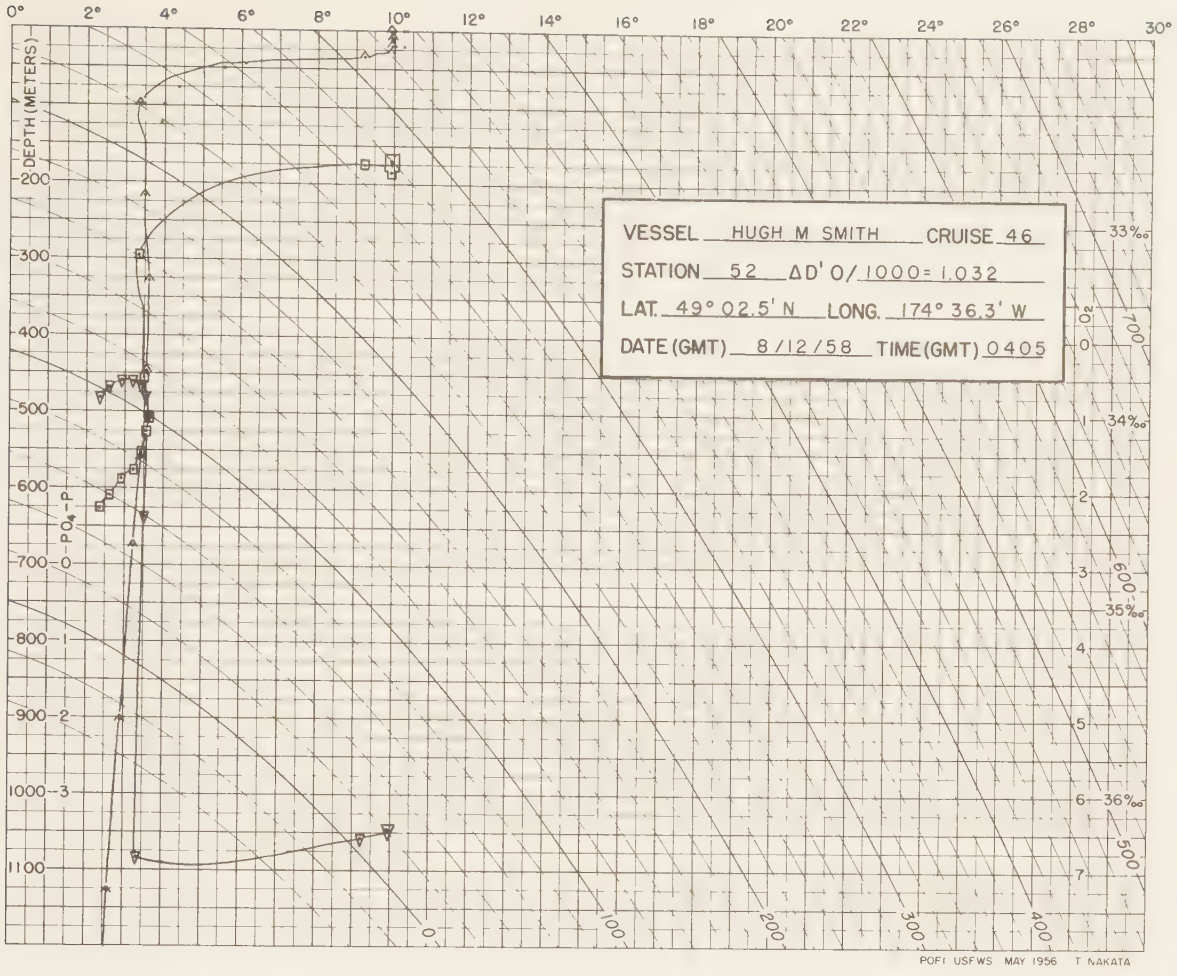
*Values of duplicate did not agree within 0.1 µg at./L. tolerance so both are carried.


VESSEL HUGH M SMITH CRUISE 46
STATION 51 Δ D' O/ 1000 = 0.969
LAT. 50° 00.5' N LONG. 174° 03' W
DATE (GMT) 8/11/58 TIME (GMT) 1944
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: 01, cloud coverage: 1. Wind: 250°, 24 kts. Sea: 5-8 ft. Wire angle: 22°.
BT slide: 168. Dry bulb: 53.0°F. Wet bulb: 50.3°F. Barometric pressure: 1014 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	9.70	32.51	288.9	6.48	0.91
10	9.72	32.52	288.5	6.45	0.83
19	9.71	32.54	286.9	6.48	0.91
33	7.58	32.74 2/	241.1	6.68	1.48
96	3.69	33.46	143.1	4.67	2.82
211	4.03	34.00	105.7	0.80	3.32
318	3.81	34.12 2/	94.6	0.58	3.48
430	3.62	34.23	84.6	0.60	3.72
539	3.39	34.31 2/	76.5	0.59	3.64
649	3.32	34.32	75.1	0.47	3.64
867	2.96	34.41	65.0	0.50	0.50 P
1082	2.66	34.46	58.9	0.58	3.48
1288	2.44	34.50	54.1	0.76	3.85

2/ Indicates H_2S precipitate in salinity sample.


VESSEL HUGH M SMITH CRUISE 46
STATION 52 ΔD' O/1000= 1.032
LAT. 49° 02.5' N LONG. 174° 36.3' W
DATE (GMT) 8/12/58 TIME (GMT) 0405
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: 45, cloud coverage: 9. Wind: 280°, 20 kts. Sea: 5-8 ft. Wire angle: 20°.
BT slide: 172. Dry bulb: 52.1°F. Wet bulb: 50.6°F. Barometric pressure: 1019 mbs.

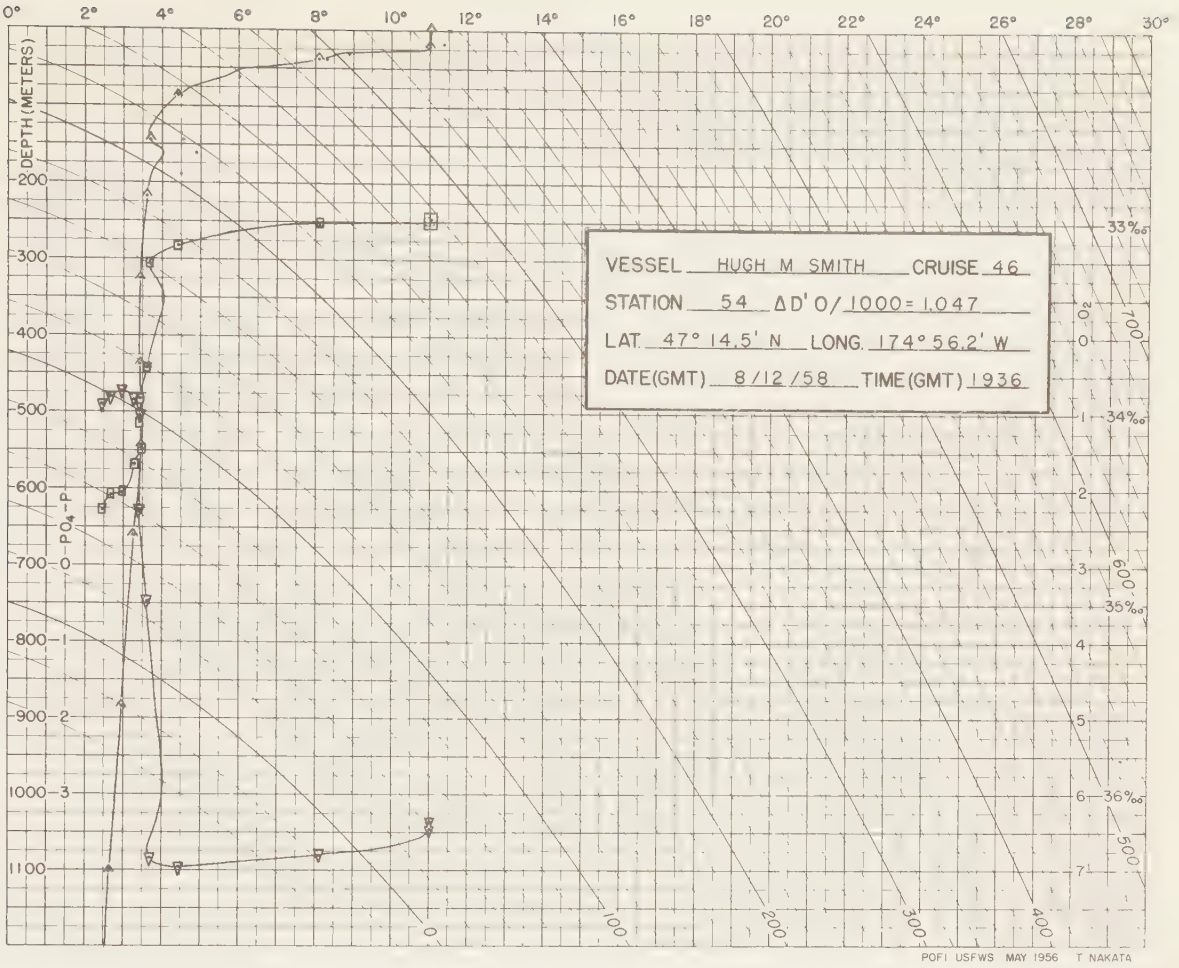
Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	9.94	32.74 2/	275.7	6.45	1.16
10	9.96	32.68	280.3	6.48	1.16
20	9.96	32.70 2/	278.9	6.49	1.08
34	9.22	32.70	267.7	6.58	1.48
99	3.36	33.18	161.4	6.83	1.82
218	3.48	33.82	114.1	2.36	3.32
329	3.61	34.03 2/	99.6	1.04	3.81
447	3.55	34.10 2/	93.8	0.80	3.81
561	3.41	34.22 2/	83.5	0.64	3.48
676	3.22	34.26 2/	78.8	0.60	3.48
903	2.90	34.35	69.2	0.59	3.48
1128	2.60	34.44 2/	59.9	0.68	3.48
1339	2.36	34.50 2/	53.3	0.81	3.40

2/ Indicates H_2S precipitate in salinity sample.

Weather: 47, cloud coverage: 9. Wind: 290°, 18 kts. Sea: 3-5 ft. Wire angle: 18°.
BT slide: 177. Dry bulb: 52.5°F. Wet bulb: 51.8°F. Barometric pressure: 1025 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	10.72	33.00 2/	268.9	6.41	1.16
15	10.72	33.00 2/	268.9	6.53	1.32
25	8.66	33.04 2/	233.9	6.83	1.48
55	5.06	33.11	183.1	7.01	1.64
110	3.68	33.20	162.7	6.92	1.82
221	3.40	33.77 2/	117.3	3.12	3.00
333	3.42	33.96 2/	103.1	1.83	3.48
451	3.46	34.06	96.0	1.78	3.48
564	3.38	34.13	90.0	1.03	3.64
677	3.23	34.24 2/	80.3	0.75	3.64
897	2.92	34.36 2/	68.6	0.71	3.64
1116	2.66	34.40	63.4	0.72	3.81
1323	2.42	34.49	54.7	0.81	3.90

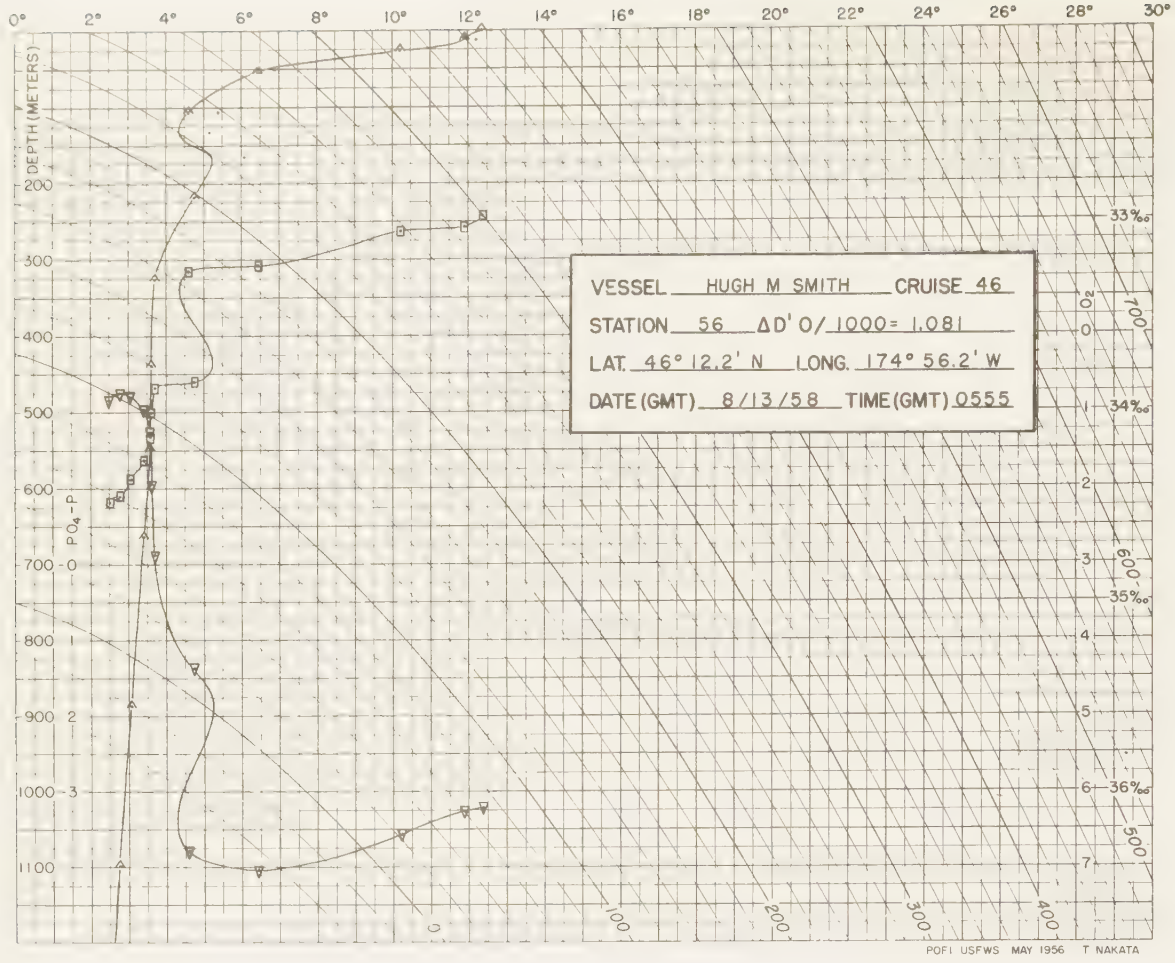
2/ Indicates H_2S precipitate in salinity sample.


VESSEL HUGH M SMITH CRUISE 46
STATION 54 ΔD' O/1000 = 1.047
LAT. 47° 14.5' N LONG. 174° 56.2' W
DATE(GMT) 8/12/58 TIME(GMT) 1936
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T. NAKATA

Weather: 01, cloud coverage: 2. Wind: 280°, 10 kts. Sea: 1-3 ft. Wire angle: 00°.
BT slide: 182. Dry bulb: 56.4°F. Wet bulb: 54.0°F. Barometric pressure: 1024 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	11.05	32.99 2/	275.2	6.35	1.40
21	11.01	33.00 2/	273.9	6.45	1.24
38	8.10	33.01 2/	228.3	6.80	1.56
85	4.42	33.13 2/	175.1	6.95	1.82
144	3.67	33.22	160.9	6.83	2.00
218	3.61	33.77 2/	119.1	3.47	3.09
325	3.43	33.93	105.4	2.27	3.48
437	3.42	34.05 2/	96.4	1.49	3.25
545	3.46	34.19 2/	86.1	1.09	3.48
660	3.27	34.27 2/	78.3	0.83	3.56
884	2.96	34.42 2/	64.3	0.72	3.52
1101	2.66	34.43 2/	61.1	0.80	3.56
1313	2.44	34.51 2/	53.4	0.89	3.64

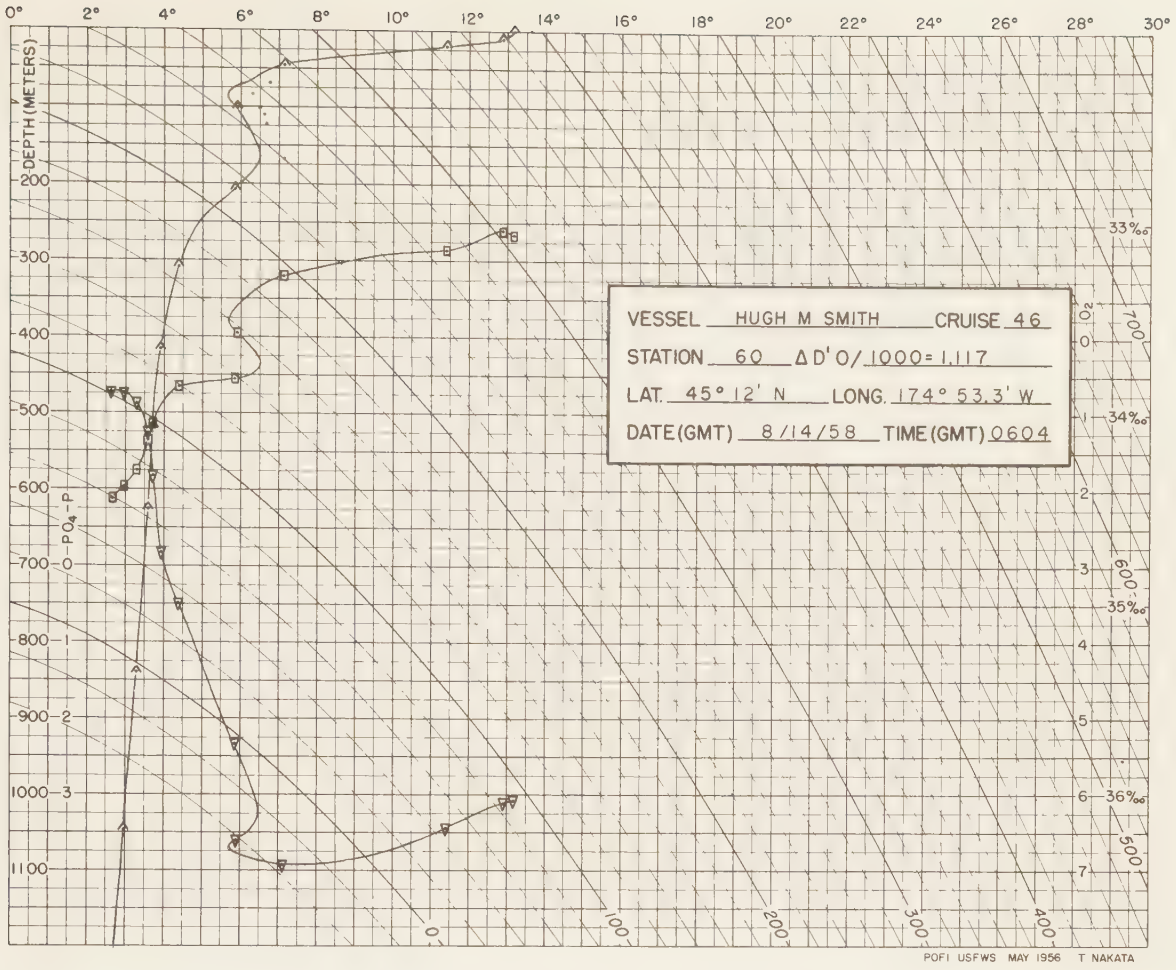
2/ Indicates H_2S precipitate in salinity sample.



Weather: 47, cloud coverage: 4. Wind: 280°, 10 kts. Sea: 1-3 ft. Wire angle: 04°.
BT slide: 187. Dry bulb: 55.0°F. Wet bulb: 53.9°F. Barometric pressure: 1026 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O2, ml./L.	PO4-P, µg at./L.
0	12.38	32.97	300.1	6.21	1.48
11	11.88	33.03	286.7	6.26	1.32
27	10.22	33.05	257.1	6.57	1.32
53	6.43	33.23 2/	189.9	7.03	1.48
106	4.60	33.26	167.1	6.79	1.64
218	4.76	33.84	125.2	4.37	2.63
325	3.71	33.87	112.4	2.87	3.17
438	3.61	34.00	101.8	1.93	3.81
548	3.58	34.13 2/	91.7	1.27	3.81
663	3.41	34.25 2/	81.2	0.96	4.25
886	3.06	34.35	70.4	0.79	3.64
1099	2.78	34.44	61.3	0.73	3.81
1310	2.50	34.47	56.8	0.83	3.56

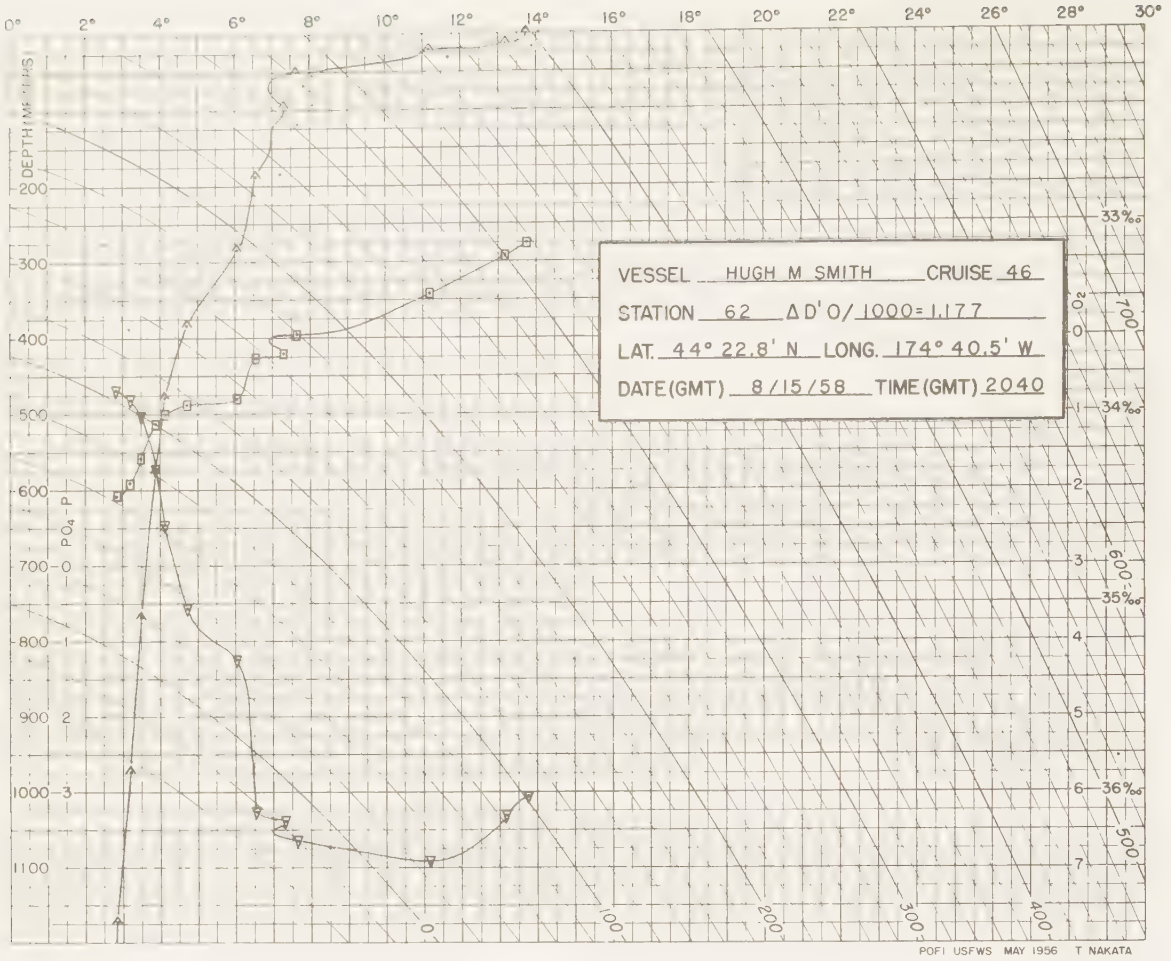
2/ Indicates H_2S precipitate in salinity sample.


VESSEL HUGH M SMITH CRUISE 46
STATION 60 Δ D' O/ 1000 = 1.117
LAT. 45° 12' N LONG. 174° 53.3' W
DATE (GMT) 8/14/58 TIME (GMT) 0604
DEPTH (METERS)
O - PO4 - P
POFI USFWS MAY 1956 T NAKATA

Weather: 40, cloud coverage: 8. Wind: 320°, 06 kts. Sea: 1-3 ft. Wire angle: 16°.
BT slide: 195. Dry bulb: 56.5°F. Wet bulb: 55.0°F. Barometric pressure: 1027 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	13.18	33.06 2/	308.3	6.08	1.32
10	12.87	33.04	304.0	6.11	1.40
20	11.40	33.14 2/	270.1	6.44	1.48
45	7.12	33.28 2/	195.0	6.92	1.64
101	5.88	33.58	157.1	6.60	1.48
207	5.84	33.82	138.6	5.33	2.00
308	4.39	33.86 2/	120.0	3.49	3.00
415	3.92	34.21 2/ P	88.9	2.81	3.32
518	3.71	34.06	98.2	1.81	3.64
627	3.58	34.14	91.0	1.28	3.90
839	3.27	34.30 2/	76.1	0.87	3.81
1046	2.95	34.39	66.5	0.73	4.25
1257	2.65	34.45 2/	59.6	0.71	4.10

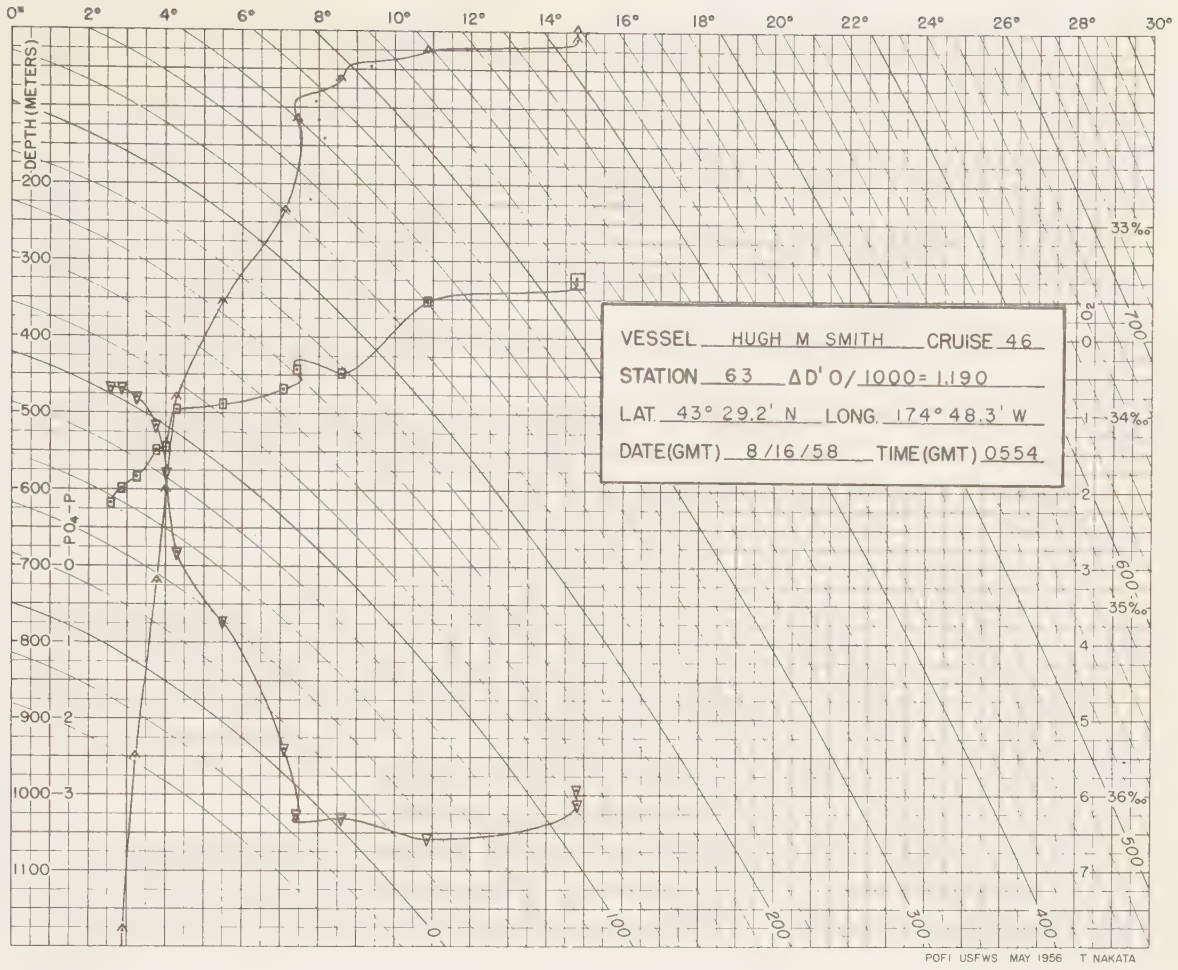
2/ Indicates H_2S precipitate in salinity sample.


VESSEL HUGH M SMITH CRUISE 46
STATION 62 ΔD'O/1000=1.177
LAT. 44° 22.8' N LONG. 174° 40.5' W
DATE(GMT) 8/15/58 TIME(GMT) 2040
POFI USFWS MAY 1956 T NAKATA

Weather: 45, cloud coverage: 9. Wind: 010°, 22 kts. Sea: 3-5 ft. Wire angle: 32°.
BT slide: 202. Dry bulb: 59.0°F. Wet bulb: 57.2°F. Barometric pressure: 1016 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	13.75	33.10	316.3	6.06	1.00
13	13.18	33.17 2/	300.2	6.30	0.83
21	11.18	33.37 2/	249.4	6.92	0.83
50	7.64	33.58 2/	179.6	6.63	1.32
94	7.31	33.68 2/	167.7	6.38	1.48
188	6.56	33.71 2/	155.7	6.26	1.32
283	6.03	33.92	133.5	4.22	2.41
383	4.73	33.95 2/	116.8	3.56	2.62
479	4.14	34.00 2/	106.7	2.44	3.48
576	3.88	34.05	100.6	1.73	3.64
769	3.50	34.23	83.5	1.02	3.64
972	3.20	34.36	71.0	0.80	4.00
1173	2.83	34.43	62.5	0.68	4.10

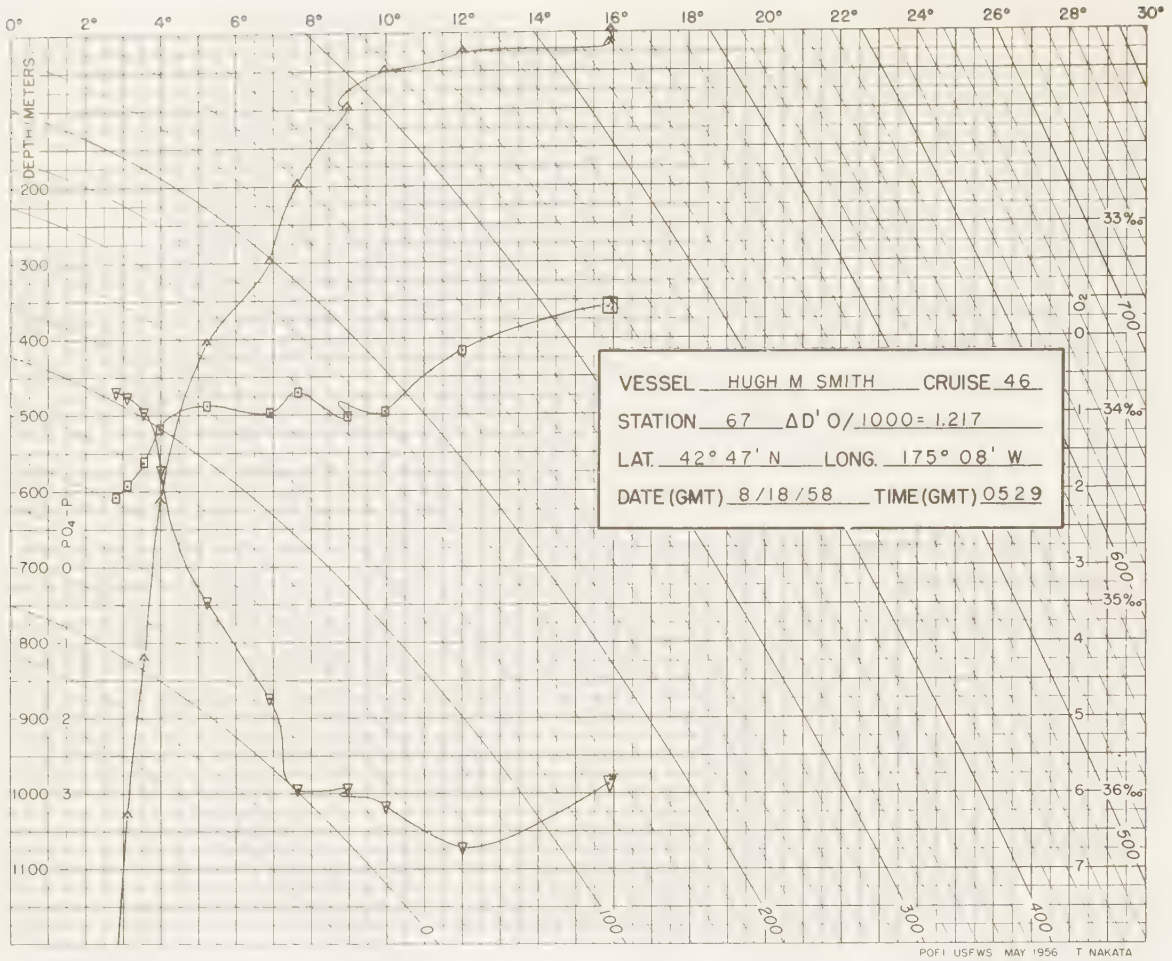
2/ Indicates H_2S precipitate in salinity sample.


VESSEL HUGH M SMITH CRUISE 46
STATION 63 ΔD' O/1000= 1.190
LAT. 43° 29.2' N LONG. 174° 48.3' W
DATE(GMT) 8/16/58 TIME(GMT) 0554
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: 40, cloud coverage: 8. Wind: 310°, 17 kts. Sea: 3-5 ft. Wire angle: 01°.
BT slide: 206. Dry bulb: 58.9°F. Wet bulb: 57.2°F. Barometric pressure: 1019 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	14.80	33.31 2/	322.0	5.93	0.83
10	14.80	33.28	324.2	6.11	0.83
26	10.86	33.41 2/	241.0	6.58	1.00
63	8.60	33.79	177.5	6.30	1.32
116	7.42	33.77	162.3	6.26	1.32
234	7.07	33.87	150.2	5.38	1.48
354	5.49	33.95 2/	125.0	3.71	2.82
480	4.29	33.98 2/	109.9	2.81	3.17
600	4.00	34.18 2/	91.9	1.76	3.48
720	3.76	34.19	88.8	1.16	3.48
950	3.24	34.33	73.6	0.79	4.25
1179	2.86	34.39	65.8	0.68	4.25
1395	2.58	34.47	57.4	0.65	3.48

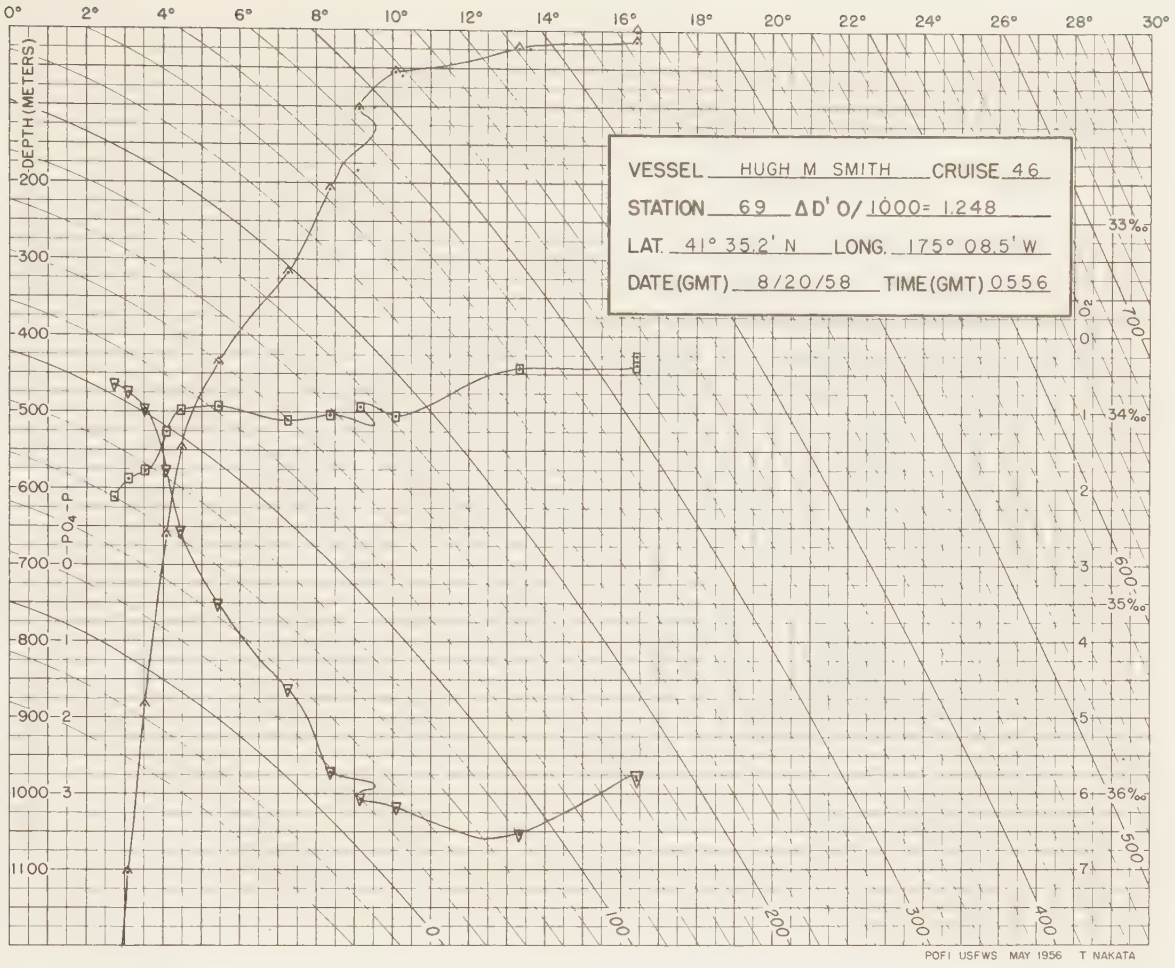
2/ Indicates H_2S precipitate in salinity sample.


VESSEL HUGH M SMITH CRUISE 46
STATION 67 ΔD' O/1000= 1.217
LAT. 42° 47' N LONG. 175° 08' W
DATE (GMT) 8/18/58 TIME (GMT) 0529
DEPTH - METERS
PO4 - P
POFI USFWS MAY 1956 T NAKATA

Weather: 40, cloud coverage: 8. Wind: 290°, 18 kts. Sea: 3-5 ft. Wire angle: 29°.
BT slide: 216. Dry bulb: 60.1°F. Wet bulb: 58.9°F. Barometric pressure: 1006 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	15.94	33.41	338.5	5.81	0.50
9	15.96	33.45	336.0	5.81	0.59
14	15.86	33.44	334.7	5.87	0.50
27	12.00	33.66 2/	242.7	6.72	0.70
50	9.98	33.98	184.8	6.17	1.00
99	8.97	34.01	166.5	5.93	1.32
199	7.63	33.88	157.1	5.94	1.16
300	6.89	33.99	139.1	4.73	1.91
406	5.22	33.95	121.9	3.47	2.63
613	3.98	34.07	100.0	1.70	3.32
821	3.56	34.25	82.6	0.94	3.64
1030	3.12	34.37	69.5	0.75	4.00
1231	2.80	34.43 2/	62.2	0.68	3.81

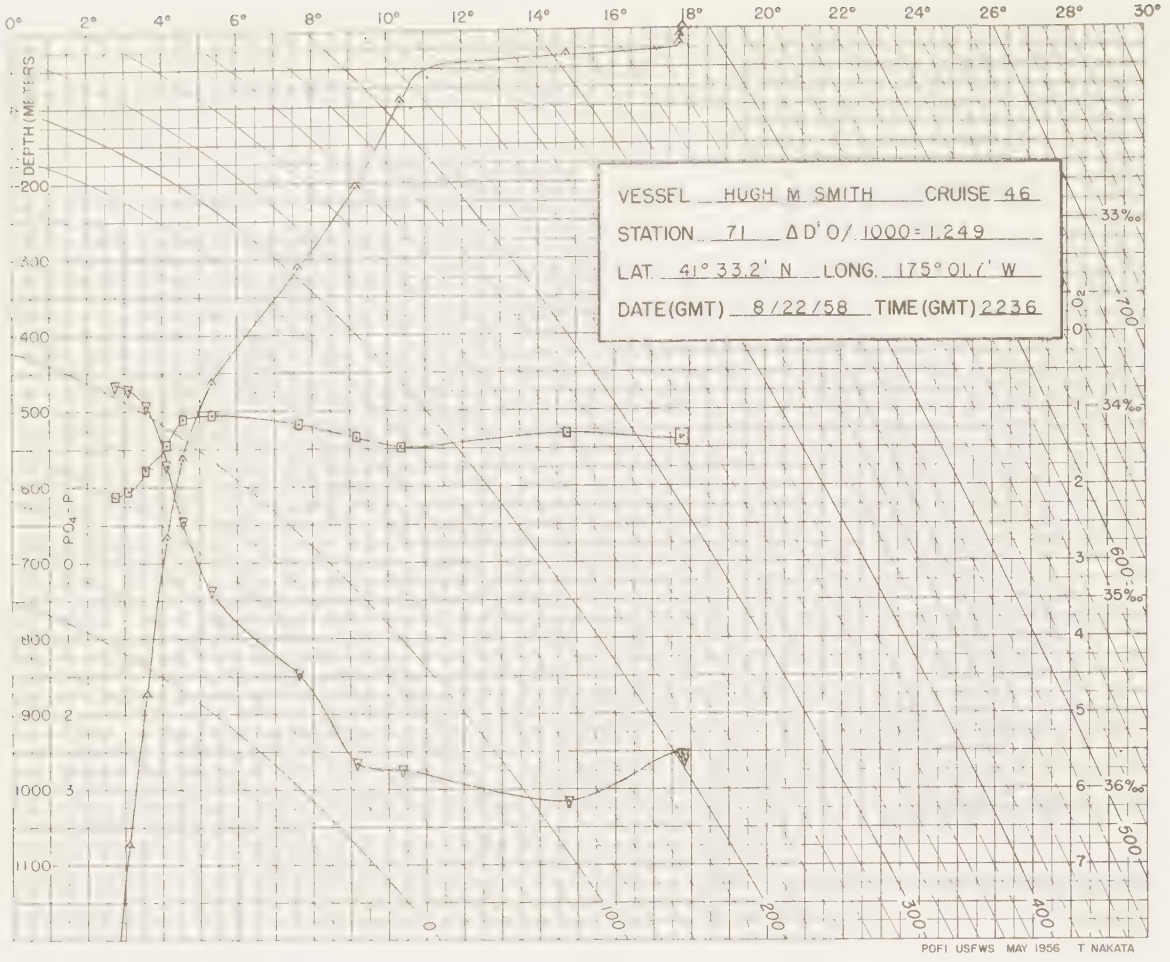
2/ Indicates H_2S precipitate in salinity sample.


VESSEL HUGH M SMITH CRUISE 46
STATION 69 ΔD' O/1000= 1.248
LAT. 41° 35.2' N LONG. 175° 08.5' W
DATE(GMT) 8/20/58 TIME(GMT) 0556
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: 02, cloud coverage: 8. Wind: 360°, 18 kts. Sea: 5-8 ft. Wire angle: 27°.
BT slide: 225. Dry bulb: 58.8°F. Wet bulb: 53.9°F. Barometric pressure: 1015 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	16.41	33.70	327.8	5.81	0.32
14	16.41	33.75 2/	324.0	5.78	0.00
23	13.32	33.77 2/	258.9	6.52	0.20
55	10.08	34.02 2/	183.2	6.18	0.50
102	9.14	33.97	172.3	6.07	0.50
209	8.36	34.01	157.6	5.71	1.00
318	7.25	34.04	139.9	4.61	1.32
435	5.43	33.97 2/	122.8	3.51	2.00
548	4.45	33.99	110.9	2.54	2.41
662	4.07	34.10	98.6	1.77	2.63
883	3.53	34.31 2/	77.8	0.95	2.82
1103	3.07	34.35	70.6	0.73	2.82
1310	2.72	34.45	60.1	0.64	3.48

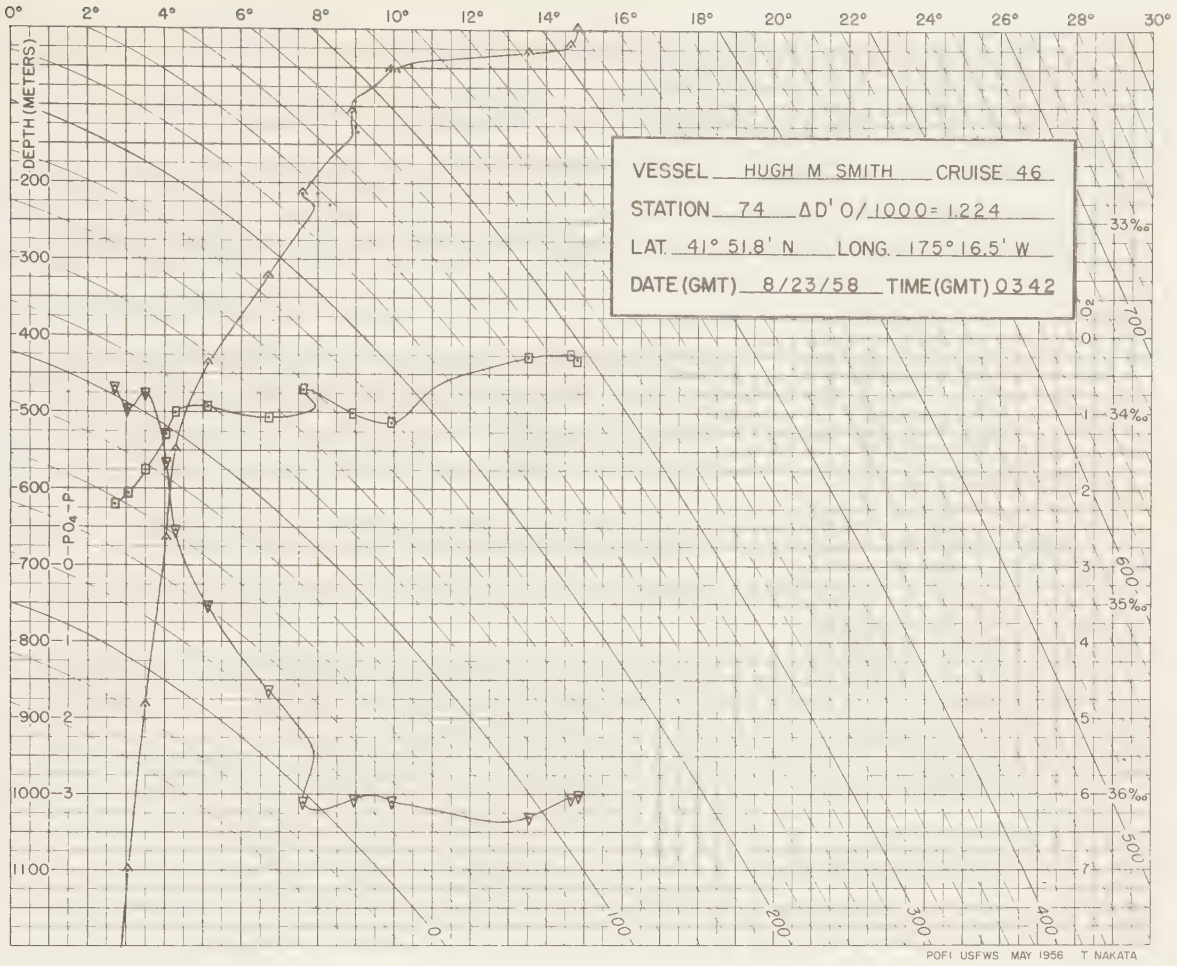
2/ Indicates H_2S precipitate in salinity sample.



Weather: 02, cloud coverage: 7. Wind: calm, 0 kts. Sea: 1 ft. Wire angle: 22°.
BT slide: 236. Dry bulb: 65.6°F. Wet bulb: 58.0°F. Barometric pressure: 1021 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	17.83	34.14	327.5	5.62	0.50
10	17.78	34.14	326.4	5.54	0.42
19	17.76	34.15	325.2	5.53	0.42
33	14.78	34.12	262.2	6.15	0.32
93	10.38	34.19 2/	175.7	5.73	0.83
206	9.16	34.14 2/	159.9	5.64	1.16
312	7.62	34.07	142.8	4.46	1.82
463	5.32	34.02 2/	117.8	3.36	2.62
563	4.57	34.04	108.2	2.45	3.00
668	4.14	34.18 2/	93.2	1.71	3.17
875	3.58	34.31	78.2	0.92	3.24
1075	3.11	34.42	65.6	0.70	3.81
1280	2.77	34.45	60.5	0.65	3.72

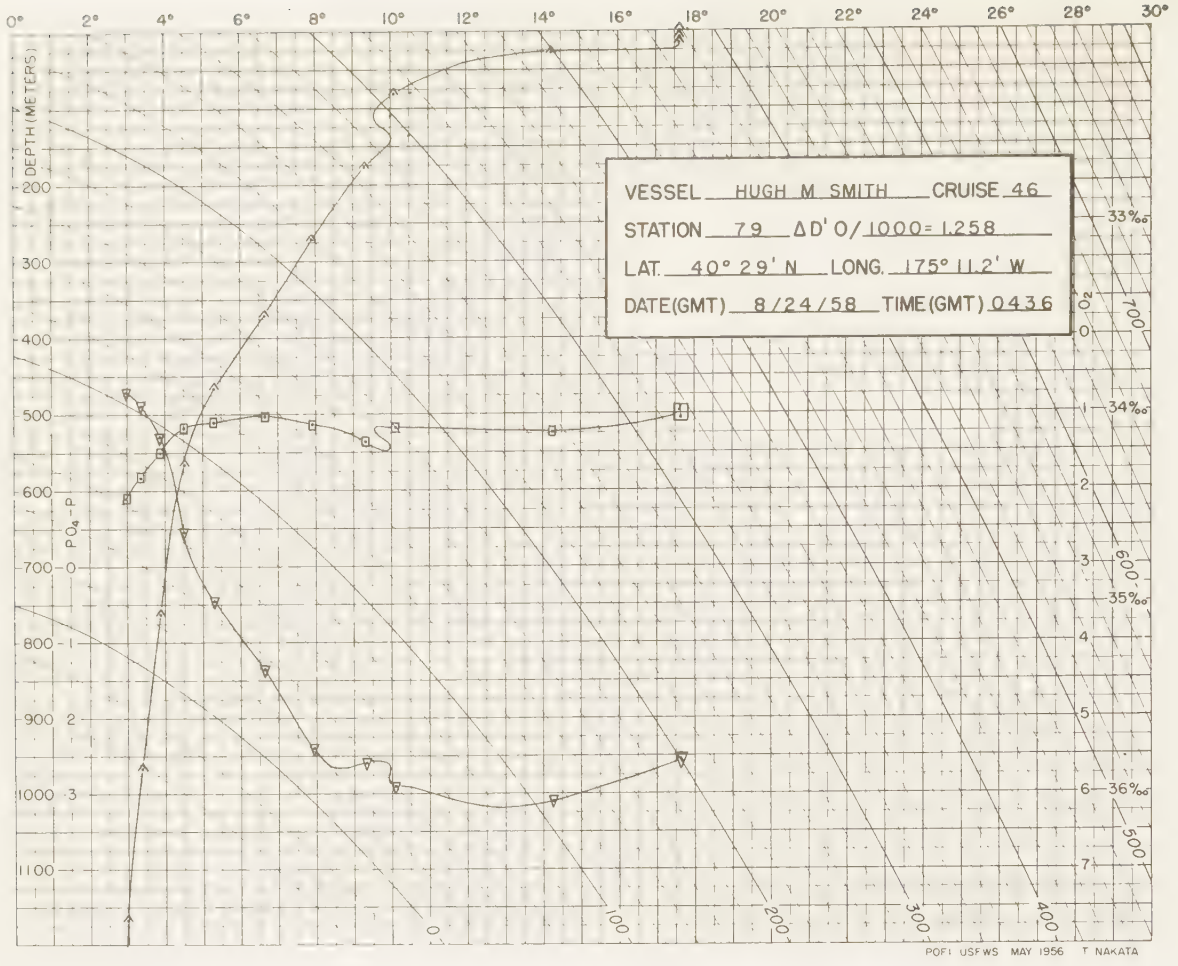
2/ Indicates H_2S precipitate in salinity sample.


VESSEL HUGH M SMITH CRUISE 46
STATION 74 ΔD' O/1000= 1.224
LAT. 41° 51.8' N LONG. 175° 16.5' W
DATE (GMT) 8/23/58 TIME (GMT) 0342
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: 02, cloud coverage: 8. Wind: 030°, 03 kts. Sea: 1 ft. Wire angle: 22°.
BT slide: 240. Dry bulb: 62.0°F. Wet bulb: 55.8°F. Barometric pressure: 1019 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	14.83	33.72	292.5	6.01	0.64
20	14.65	33.69	291.1	6.04	0.83
30	13.54	33.71	267.5	6.30	0.59
54	9.93	34.05 2/	178.6	6.09	1.32
108	8.91	34.00	166.4	0.74 3/	0.59
214	7.61	33.88	157.0	6.10	1.24
322	6.71	34.02	134.3	4.63	2.30 P
437	5.14	33.97 2/	119.6	3.53	2.63
550	4.28	34.00	108.2	2.53	1.82 P
664	4.02	34.11 2/	97.4	1.66	3.32
883	3.48	34.30	78.0	6.06 3/	3.64
1100	3.04	34.42 2/	65.0	0.94	3.81
1305	2.73	34.48 2/	58.0	0.66	3.81

2/ Indicates H_2S precipitate in salinity sample.
3/ These two bottles may have been interchanged.

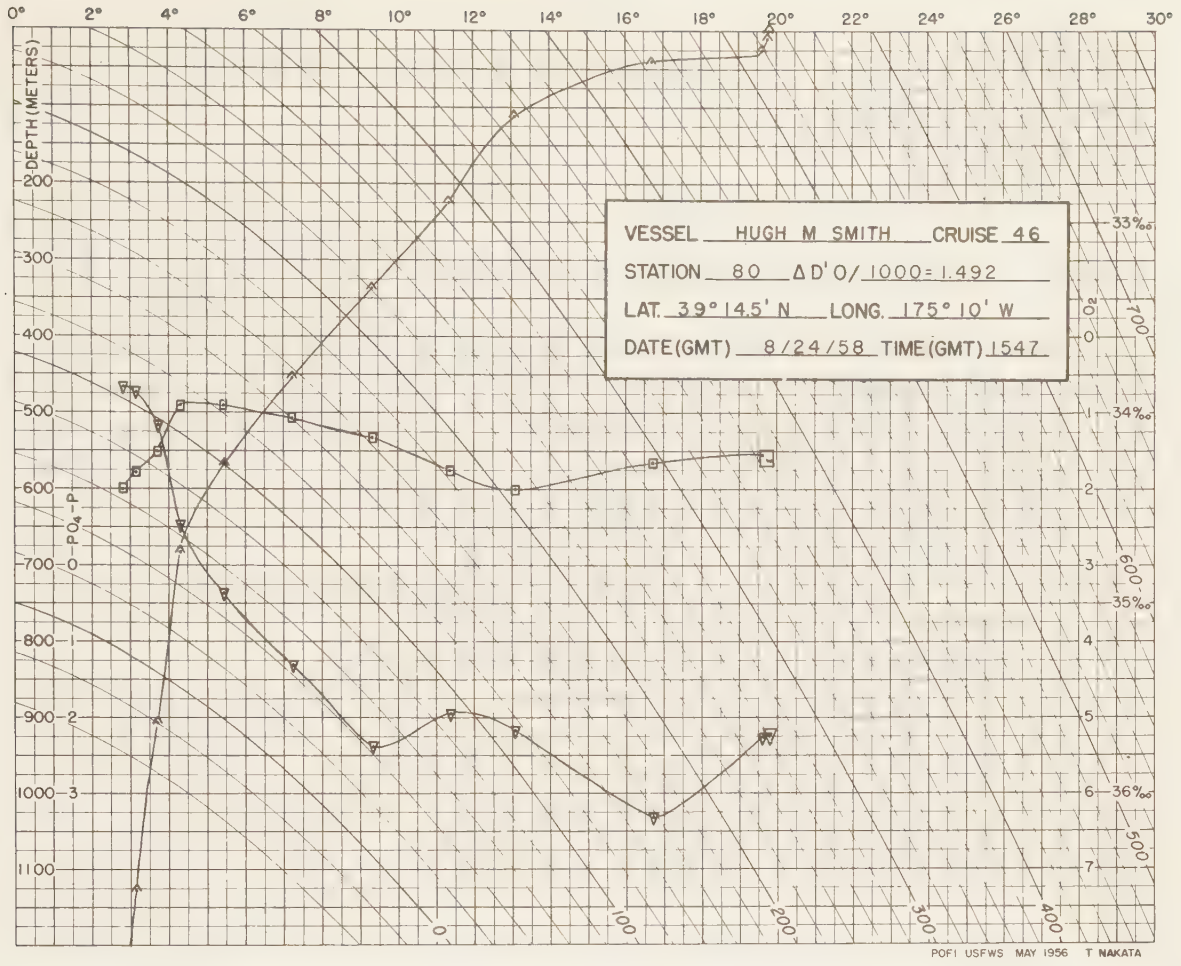

VESSEL HUGH M SMITH CRUISE 46
STATION 79 ΔD' O/1000= 1.258
LAT. 40° 29' N LONG. 175° 11.2' W
DATE(GMT) 8/24/58 TIME(GMT) 0436
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: 53, cloud coverage: 9. Wind: 110°, 19 kts. Sea: 3-5 ft. Wire angle: 35°.
BT slide: 247. Dry bulb: 62.3°F. Wet bulb: 60.5°F. Barometric pressure: 1018 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	17.62	34.02 2/	331.5	5.54	0.12
8	17.62	33.96	336.0	5.56	0.12
16	17.61	33.98	334.5	5.55	0.37
28	14.25	34.09 2/	253.8	6.10	0.26
81	10.10	34.07	179.8	5.90	0.64
179	9.34	34.14	162.7	5.59	0.91
271	7.91	34.05	148.2	5.39	1.08
370	6.63	34.01	134.1	4.34	1.56
466	5.30	34.04 2/	116.1	3.44	2.30
565	4.50	34.07	105.2	2.52	2.73
763	3.86	34.20	89.1	1.29	3.24
967	3.38	34.33	74.9	0.88	3.56
1168	2.98	34.44	62.9	0.70	3.72* 3.24

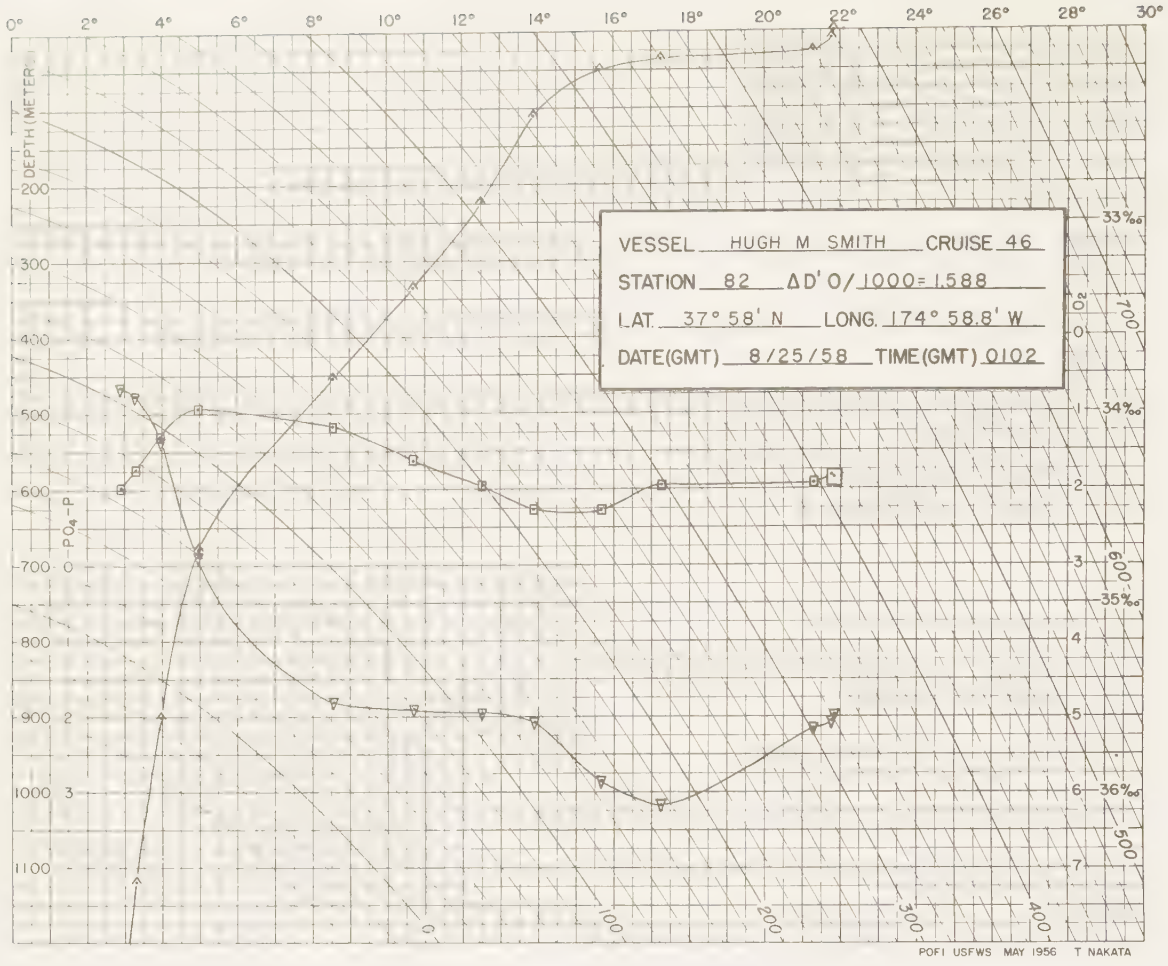
2/ Indicates H_2S precipitate in salinity sample.

*Values of duplicate did not agree within 0.1 µg at./L. tolerance so both are carried.


VESSEL HUGH M SMITH CRUISE 46
STATION 80 Δ D' O/ 1000 = 1.492
LAT. 39° 14.5' N LONG. 175° 10' W
DATE (GMT) 8/24/58 TIME (GMT) 1547
DEPTH (METERS)
PO4 - P
POFI USFWS MAY 1956 T NAKATA

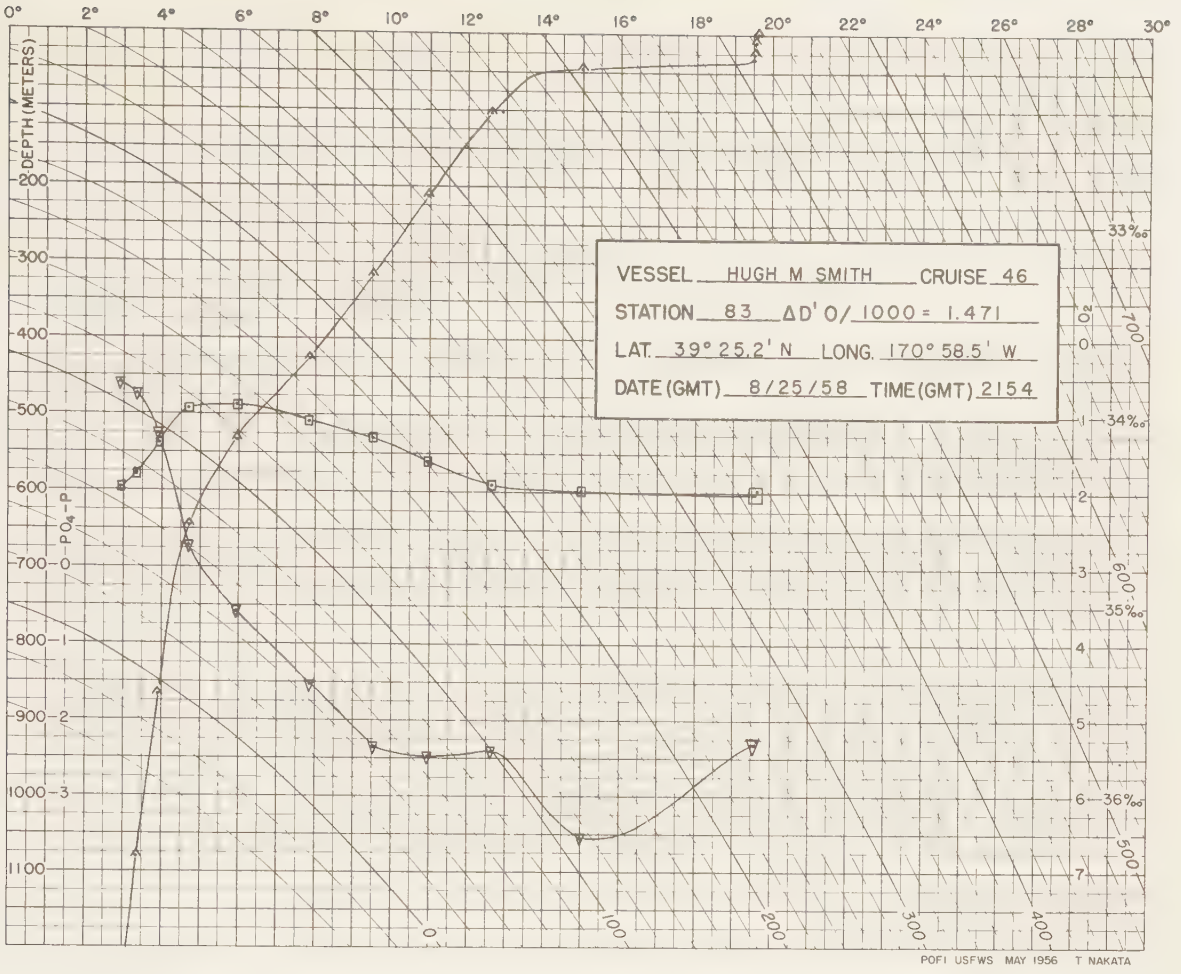
Weather: 00, cloud coverage: not recorded. Wind: 200°, 19 kts. Sea: 3-5 ft. Wire angle: 17°. BT slide: 252. Dry bulb: 70.3°F. Wet bulb: 69.3°F. Barometric pressure: 1013 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	19.80	34.25	367.0	5.22	0.00
10	19.77	34.25	366.3	5.22	0.20
25	19.62	34.22	364.8	5.26	0.20
40	16.70	34.26	293.3	6.31	0.20
112	13.06	34.40	207.7	5.18	0.83
224	11.37	34.30	184.3	4.94	1.16
336	9.34	34.13	163.4	5.38	1.32
454	7.23	34.03	140.3	4.31	1.82
568	5.44	33.96	123.6	3.36	2.19
682	4.31	33.96	111.7	2.46	3.17
906	3.72	34.20	87.8	1.16	3.48
1128	3.16	34.31	74.4	0.73	3.64
1337	2.82	34.40	64.7	0.66	3.81



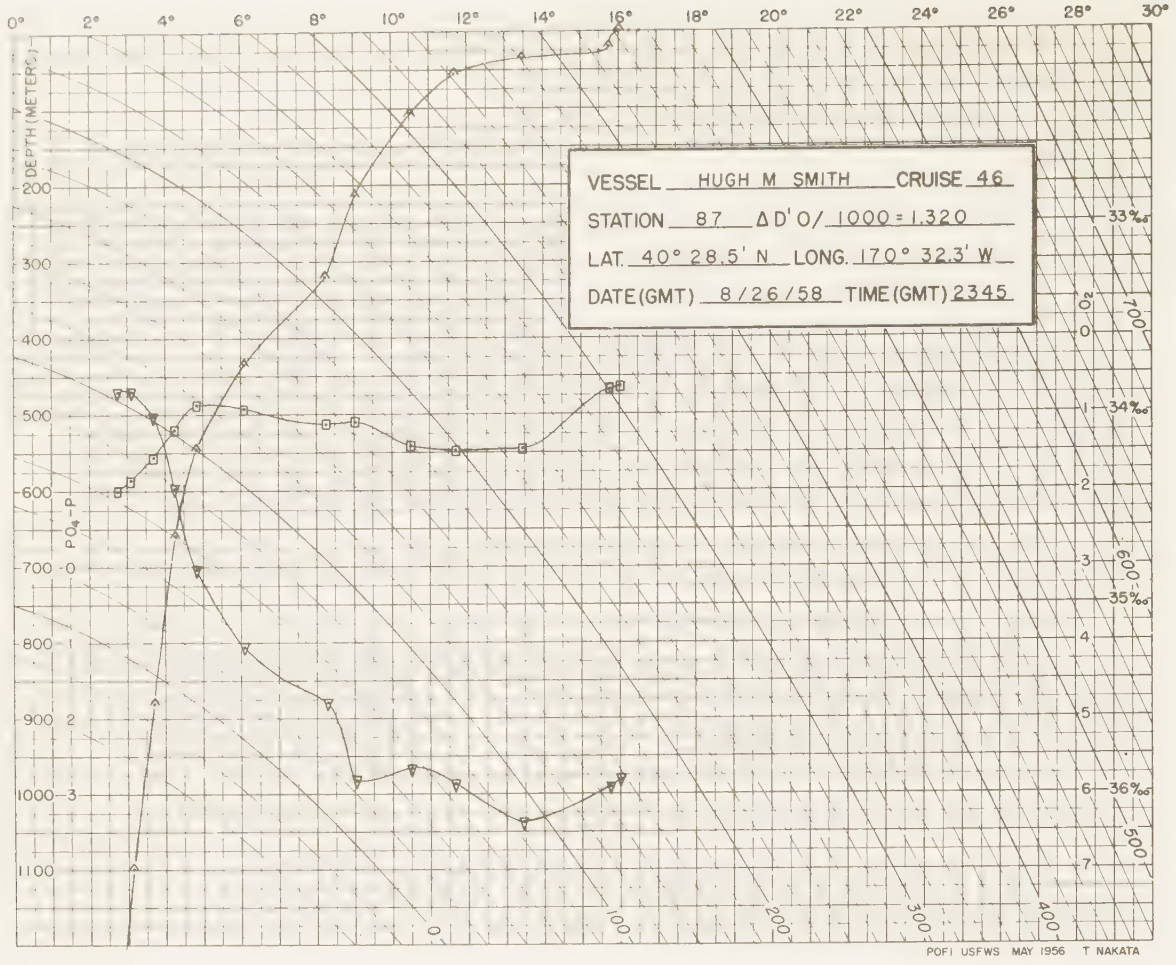
Weather: 02, cloud coverage: 6. Wind: 210°, 22 kts. Sea: 3-5 ft. Wire angle: 16°.
BT slide: 258. Dry bulb: 74.6°F. Wet bulb: 72.4°F. Barometric pressure: 1015 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O2, ml./L.	PO4-P, µg at./L.
0	21.82	34.34	412.3	4.98	0.20
10	21.76	34.33	411.4	5.05	0.20
25	21.28	34.37	396.1	5.16	0.00
35	17.24	34.38	296.6	6.17	0.00
50	15.65	34.51	252.1	5.85	0.00
110	13.88q	34.50	216.3	5.07	0.42
222	12.51	34.38	198.9	4.94	0.70
334	10.71	34.25	176.7	4.90	1.00
453	8.56	34.07	156.1	4.80	1.40
679	4.95	33.97	117.4	2.88	2.73
900	3.96	34.12	96.1	1.33	3.17
1119	3.30	34.29	77.2	0.76	3.64
1328	2.89	34.39	66.0	0.64	3.81


VESSEL HUGH M SMITH CRUISE 46
STATION 83 ΔD' O/ 1000 = 1.471
LAT. 39° 25.2' N LONG. 170° 58.5' W
DATE (GMT) 8/25/58 TIME (GMT) 2154
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

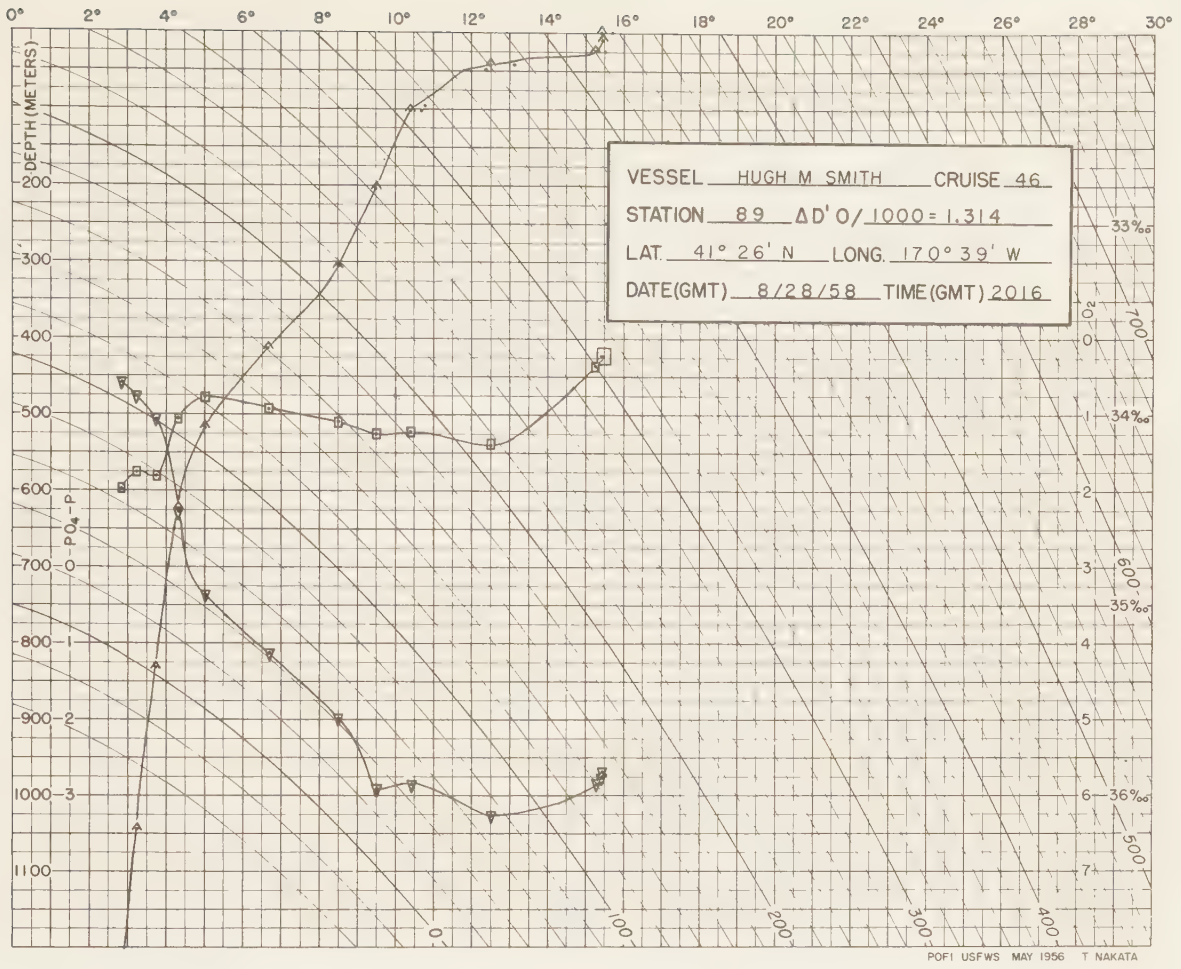
Weather: 02, cloud coverage: 8. Wind: 220°, 15 kts. Sea: 1-3 ft. Wire angle: 12°.
BT slide: 264. Dry bulb: 72.0°F. Wet bulb: 68.2°F. Barometric pressure: 1015 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	19.64	34.39	352.8	5.25	0.00
10	19.58	34.41	350.0	5.31	0.00
26	19.54	34.41	349.1	5.31	0.00
46	14.98	34.39	246.8	6.55	0.00
103	12.62	34.36	201.4	5.40	0.50
212	10.95	34.24	181.3	5.47	0.70
316	9.54	34.12	167.4	5.34	0.70
427	7.85	34.03	148.9	4.52	1.08
533	5.94	33.95	130.1	3.58	1.48
646	4.71	33.97	114.9	2.70	1.82
867	3.90	34.15	93.2	1.25	2.63
1080	3.35	34.31	76.2	0.73	2.63
1292	2.91	34.38	67.0	0.59	3.00


VESSEL HUGH M SMITH CRUISE 46
STATION 87 Δ D' O/ 1000 = 1.320
LAT. 40° 28.5' N LONG. 170° 32.3' W
DATE (GMT) 8/26/58 TIME (GMT) 2345
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

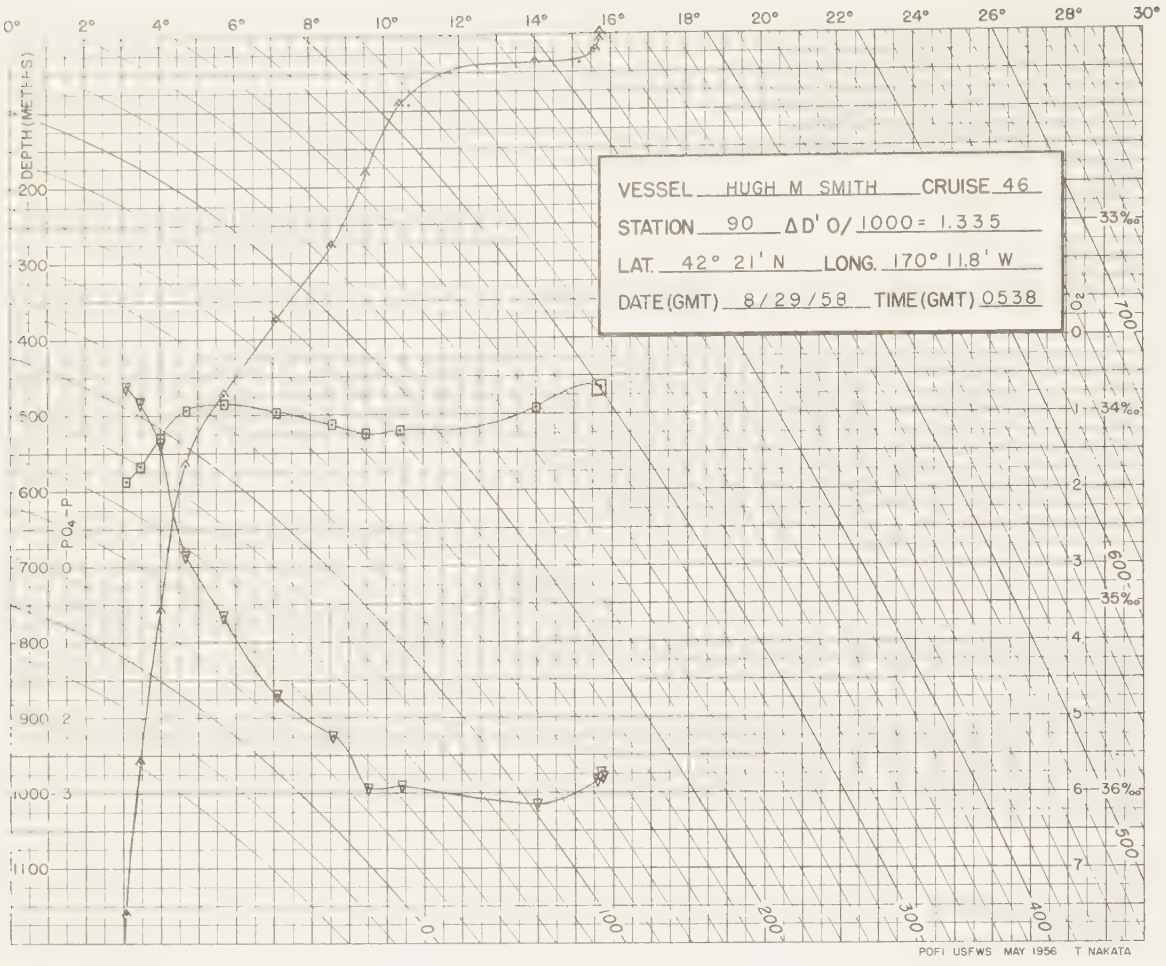
Weather: 47, cloud coverage: 9. Wind: 200°, 19 kts. Sea: 1-3 ft. Wire angle: 22°.
BT slide: 272. Dry bulb: 65.0°F. Wet bulb: 64.7°F. Barometric pressure: 1015 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	16.02	33.85	308.1	5.81	0.20
20	15.75	33.87	301.1	5.90	0.00
35	13.44	34.18	231.3	6.37	0.32
55	11.66	34.19	197.5	5.87	0.42
108	10.52	34.17	179.4	5.65	0.70
214	9.03	34.04	165.3	5.81	0.83
320	8.26	34.05	153.2	4.78	1.32
434	6.08	33.97	130.4	4.05	2.20
546	4.84	33.95	117.9	3.02	3.00
659	4.26	34.08	102.0	1.97	3.00
880	3.69	34.22	86.0	1.02	3.32
1099	3.14	34.34	72.0	0.70	3.48
1307	2.77	34.40	64.2	0.70	3.32


VESSEL HUGH M SMITH CRUISE 46
STATION 89 ΔD' O/1000 = 1.314
LAT. 41° 26' N LONG. 170° 39' W
DATE(GMT) 8/28/58 TIME(GMT) 2016
DEPTH (METERS)
PO4-P
POF1 USFWS MAY 1956 T NAKATA

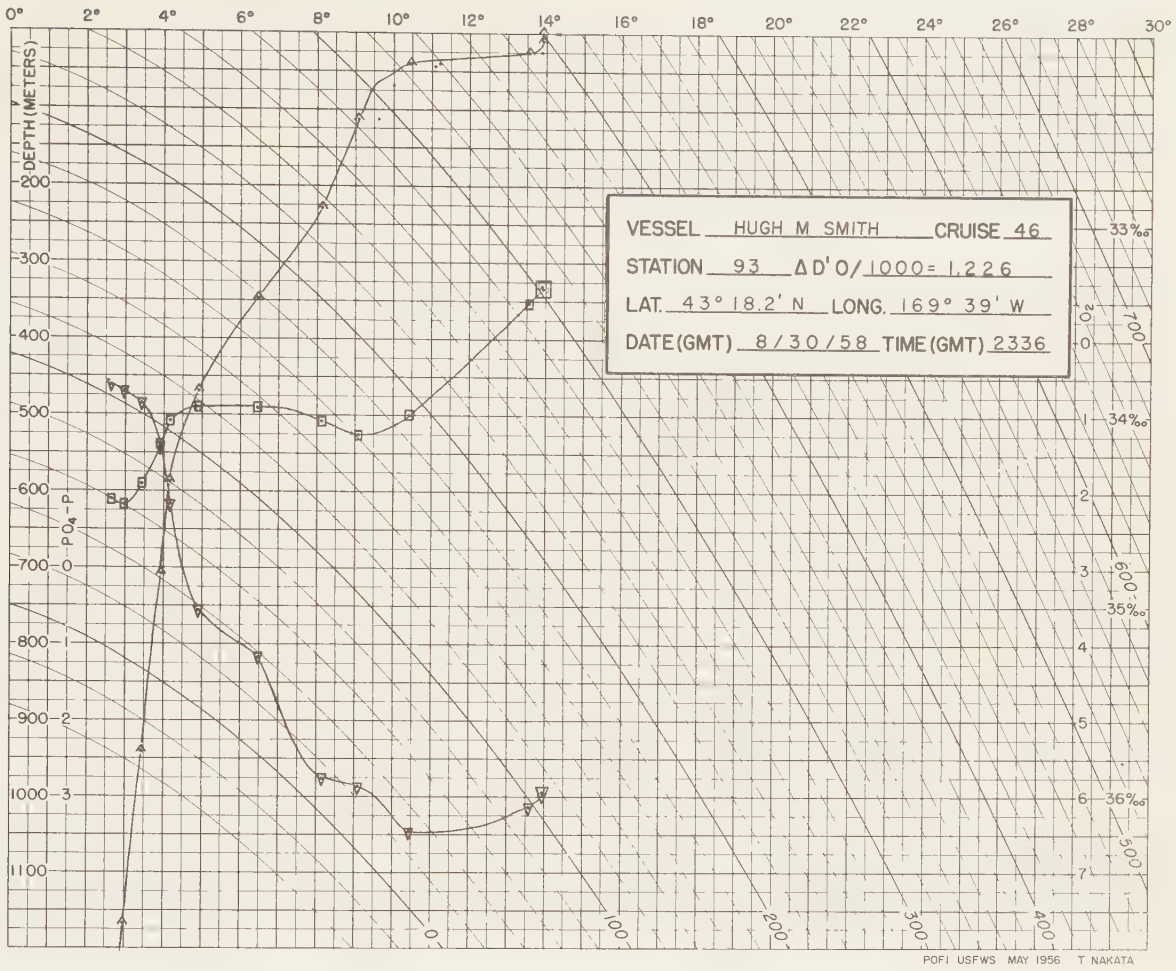
Weather: 02, cloud coverage: 9. Wind: not recorded, 12 kts. Sea: 5-8 ft. Wire angle: 30°. BT slide: 284. Dry bulb: 61.4°F. Wet bulb: 58.6°F. Barometric pressure: 1018 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl. /ton	O_2, ml. /L.	PO_4-P, µg at. /L.
0	15.42	33.69	307.0	5.76	0.70
9	15.44	33.69	307.5	5.69	0.70
23	15.26	33.74	299.9	5.84	0.59
42	12.51	34.16	215.0	6.27	0.83
102	10.40	34.09	183.4	5.84	1.16
203	9.49	34.10	167.9	5.91	1.16
306	8.51	34.04	157.8	4.99	1.64
413	6.67	33.97	137.7	4.12	1.82
518	5.00	33.91	122.4	3.36	2.00
623	4.33	34.02	107.2	2.27	2.82
832	3.74	34.32	78.9	1.07	3.00
1044	3.22	34.30	75.7	0.76	3.17
1248	2.84	34.39	65.7	0.58	2.82


VESSEL HUGH M SMITH CRUISE 46
STATION 90 ΔD' O/ 1000 = 1.335
LAT. 42° 21' N LONG. 170° 11.8' W
DATE (GMT) 8/29/58 TIME (GMT) 0538
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

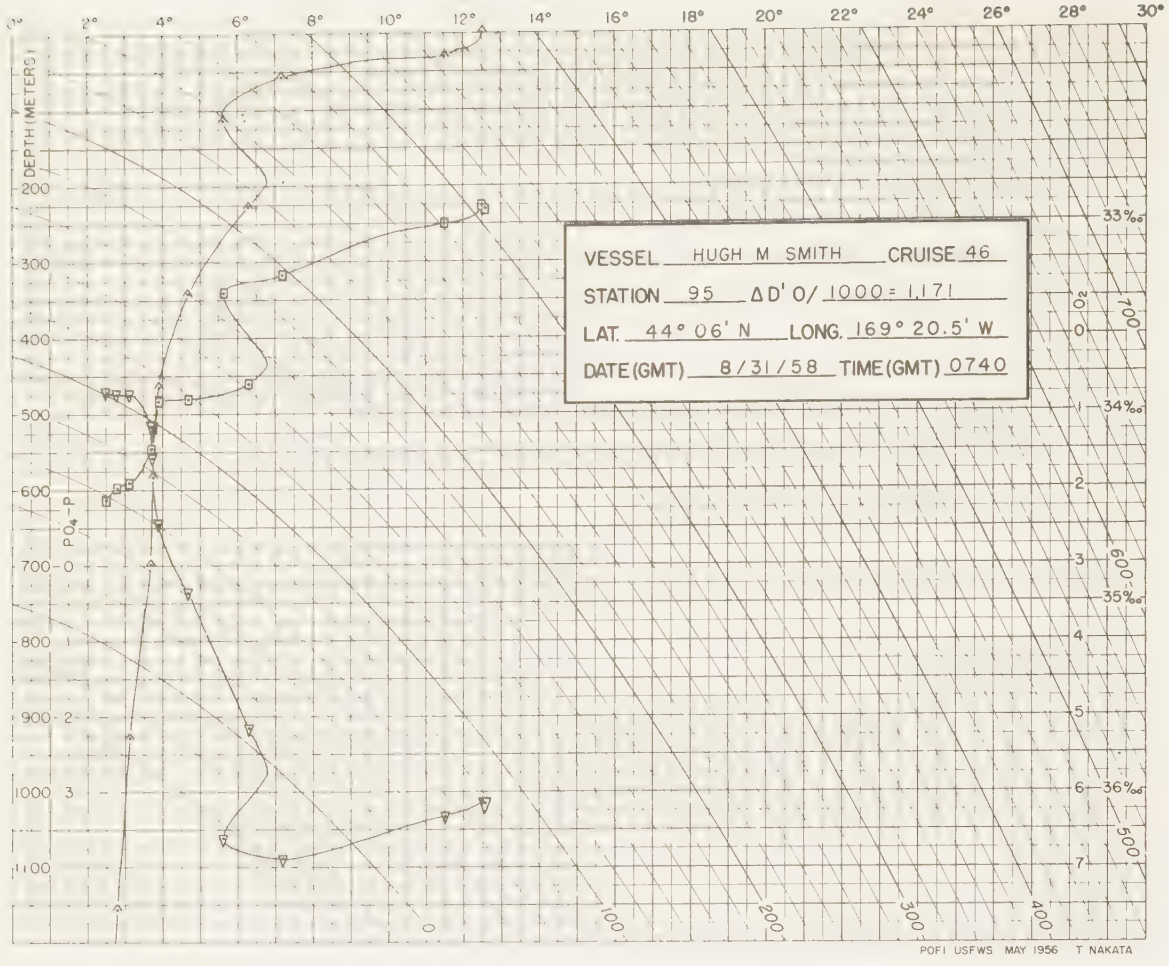
Weather: 01, cloud coverage: 6. Wind: 270°, 04 kts. Sea: 1-3 ft. Wire angle: 33°.
BT slide: 287. Dry bulb: 60.0°F. Wet bulb: 58.2°F. Barometric pressure: 1019 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	15.73	33.87	300.8	5.78	0.70
9	15.71	33.86	301.0	5.72	0.70
21	15.60	33.85	299.2	5.81	0.70
38	14.00	33.96	258.3	6.14	0.76
92	10.40	34.08	184.1	5.90	1.16
184	9.49	34.10	168.0	5.92	1.32
278	8.58	34.05	157.9	5.22	1.32
376	7.07	33.98	142.1	4.69	1.73
472	5.68	33.94	127.8	3.64	2.52
567	4.67	33.97	114.6	2.84	2.73
759	4.00	34.12	96.5	1.36	3.00
959	3.46	34.27	80.1	0.83	3.24
1160	3.08	34.35	70.6	0.60	3.24


VESSEL HUGH M SMITH CRUISE 46
STATION 93 Δ D' O/ 1000 = 1.226
LAT. 43° 18.2' N LONG. 169° 39' W
DATE (GMT) 8/30/58 TIME (GMT) 2336
DEPTH (METERS)
PO4 - P
POFI USFWS MAY 1956 T NAKATA

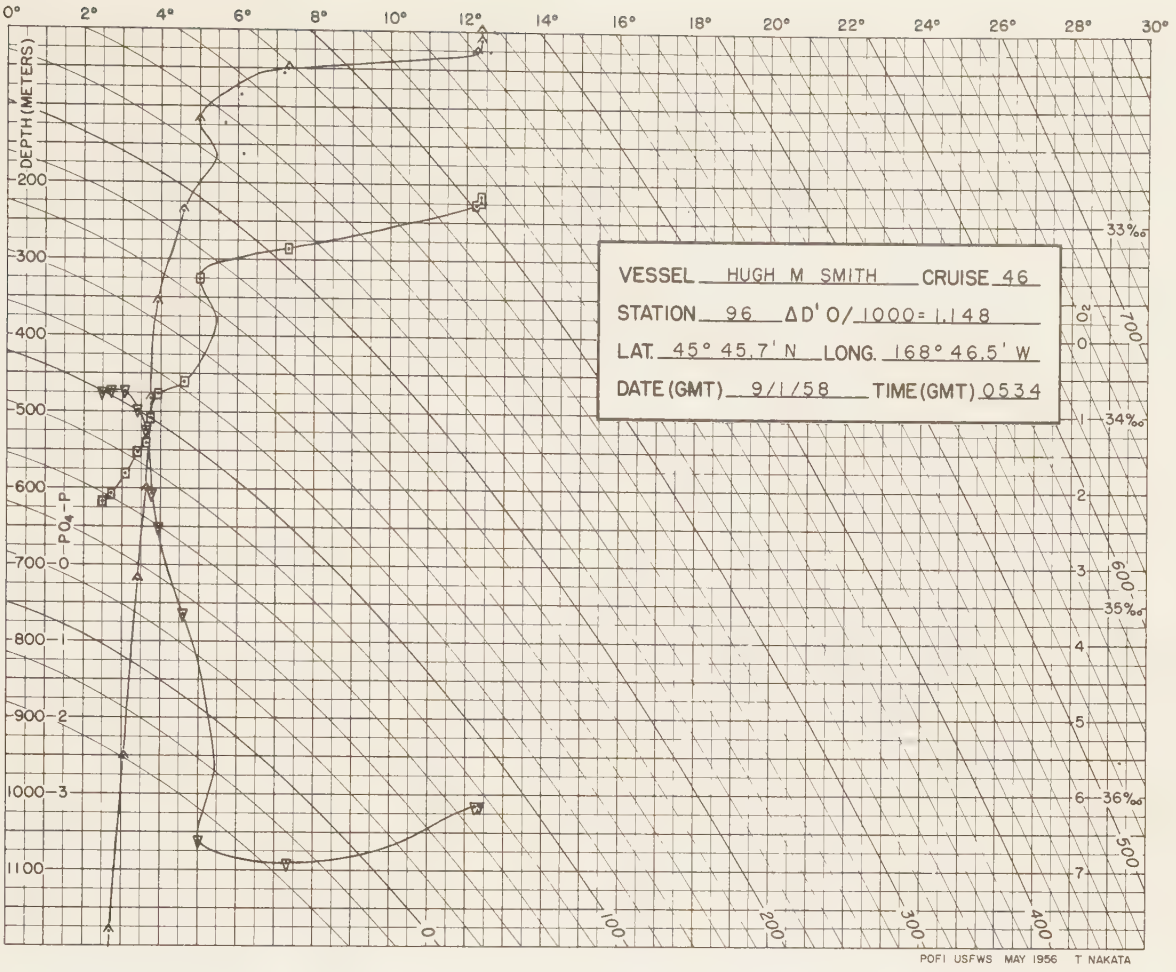
Weather: 02, cloud coverage: 6. Wind: 080°, 18 kts. Sea: 1-3 ft. Wire angle: 12°.
BT slide: 295. Dry bulb: 57.7°F. Wet bulb: 54.7°F. Barometric pressure: 1025 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	13.92	33.32	303.8	5.93	0.59
10	13.94	33.33	303.3	5.97	0.59
26	13.57	33.41	290.2	6.12	0.59
41	10.44	34.00	190.5	6.46	0.64
113	9.08	34.10	161.6	5.86	0.91
229	8.14	34.03	153.0	5.76	1.08
346	6.45	33.96	135.7	4.17	1.56
469	4.91	33.96	117.9	3.55	2.00
588	4.18	34.03	105.0	2.17	2.30
708	3.91	34.16	92.6	1.44	2.63
940	3.42	34.36	73.0	0.85	2.63
1168	2.96	34.47	60.5	0.70	2.73
1382	2.64	34.44	60.2	0.60	2.92


VESSEL HUGH M SMITH CRUISE 46
STATION 95 ΔD' O/ 1000 = 1.171
LAT. 44° 06' N LONG. 169° 20.5' W
DATE (GMT) 8/31/58 TIME (GMT) 0740
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: 50, cloud coverage: 9. Wind: 100°, 18 kts. Sea: 3-5 ft. Wire angle: 15°.
BT slide: 299. Dry bulb: 56.5°F. Wet bulb: 55.1°F. Barometric pressure: 1023 mbs.

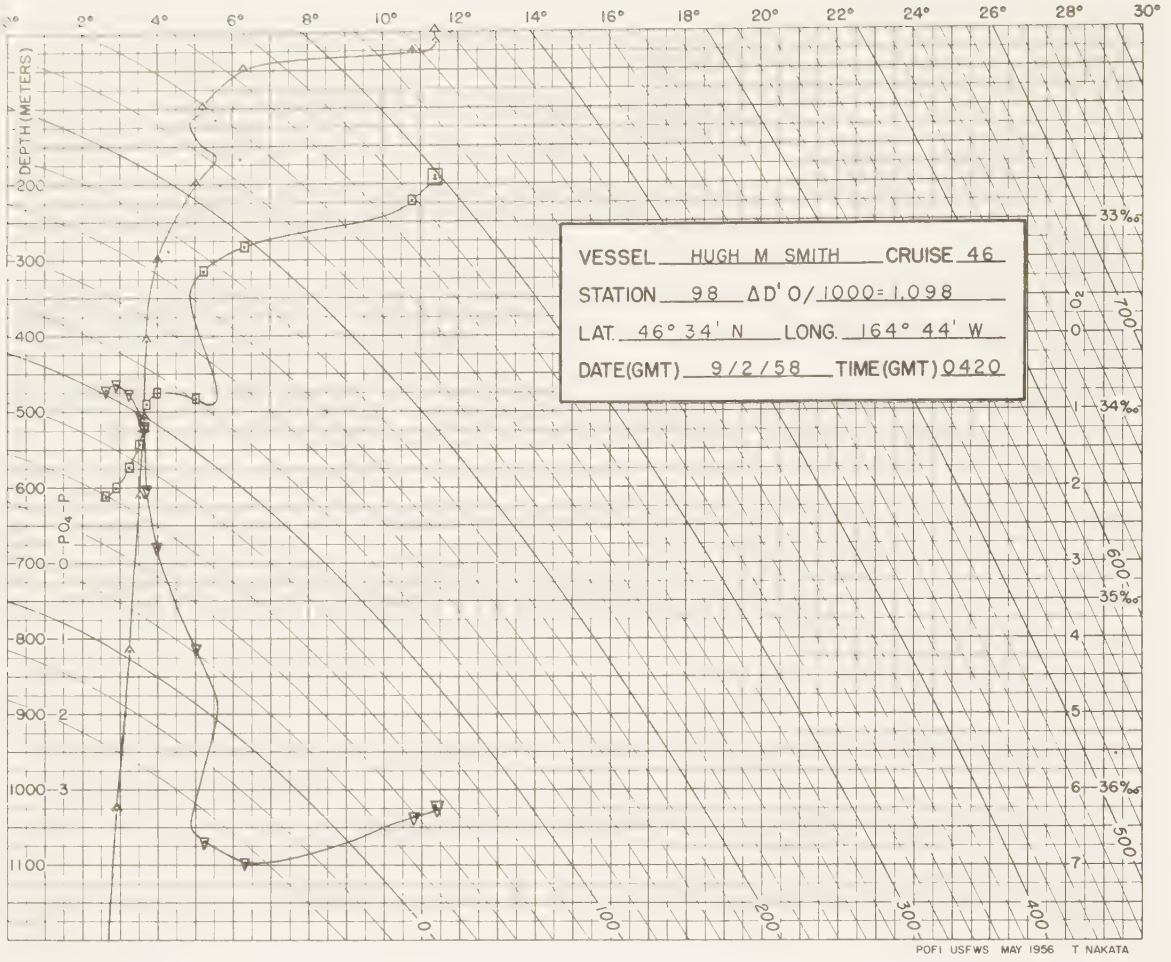
Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	12.51	32.90	307.8	6.12	0.83
10	12.58 P	32.92	307.5	6.15	0.83
31	11.50	33.00	282.2	6.32	0.83
57	7.18	33.27	196.4	6.89	1.00
113	5.61	33.36	170.5	6.61	1.16
227	6.29	33.84	142.7	5.14	1.48
342	4.68	33.92	118.6	3.36	1.82
464	3.88	33.93	109.8	2.44	2.20
582	3.74	34.07	97.7	1.57	2.30
699	3.67	34.18	88.8	1.16	2.42
928	3.12	34.36	70.3	0.73	2.91
1155	2.79	34.39	65.2	0.73	3.00
1367	2.51	34.45	58.4	0.71	3.00


VESSEL HUGH M SMITH CRUISE 46
STATION 96 ΔD' O/1000= 1.148
LAT. 45° 45.7' N LONG. 168° 46.5' W
DATE (GMT) 9/1/58 TIME (GMT) 0534
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: 55, cloud coverage: 9. Wind: 160°, 13 kts. Sea: 1-3 ft. Wire angle: 04°.
BT slide: 306. Dry bulb: 58.3°F. Wet bulb: 58.0°F. Barometric pressure: 1008 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	12.38	32.86	308.2	6.15	1.16
12	12.38	32.89	306.1	6.14	1.00
28	12.26	32.91	302.3	6.15	1.00
50	7.32	33.14	207.9	6.90	1.16
119	5.00	33.30	168.2	6.61	1.32
237	4.60	33.84	123.6	3.64	1.82
357	3.92	33.90	112.2	2.51	2.20
482	3.75	34.03	100.9	2.06	2.41
602	3.61	34.16 2/	89.8	1.22	1.82 P
720	3.41	34.21	84.2	0.98	2.82
953	3.06	34.32	72.7	0.73	3.00
1181	2.72	34.43	61.7	0.71	3.00
1395	2.48	34.47	56.6	0.76	2.91

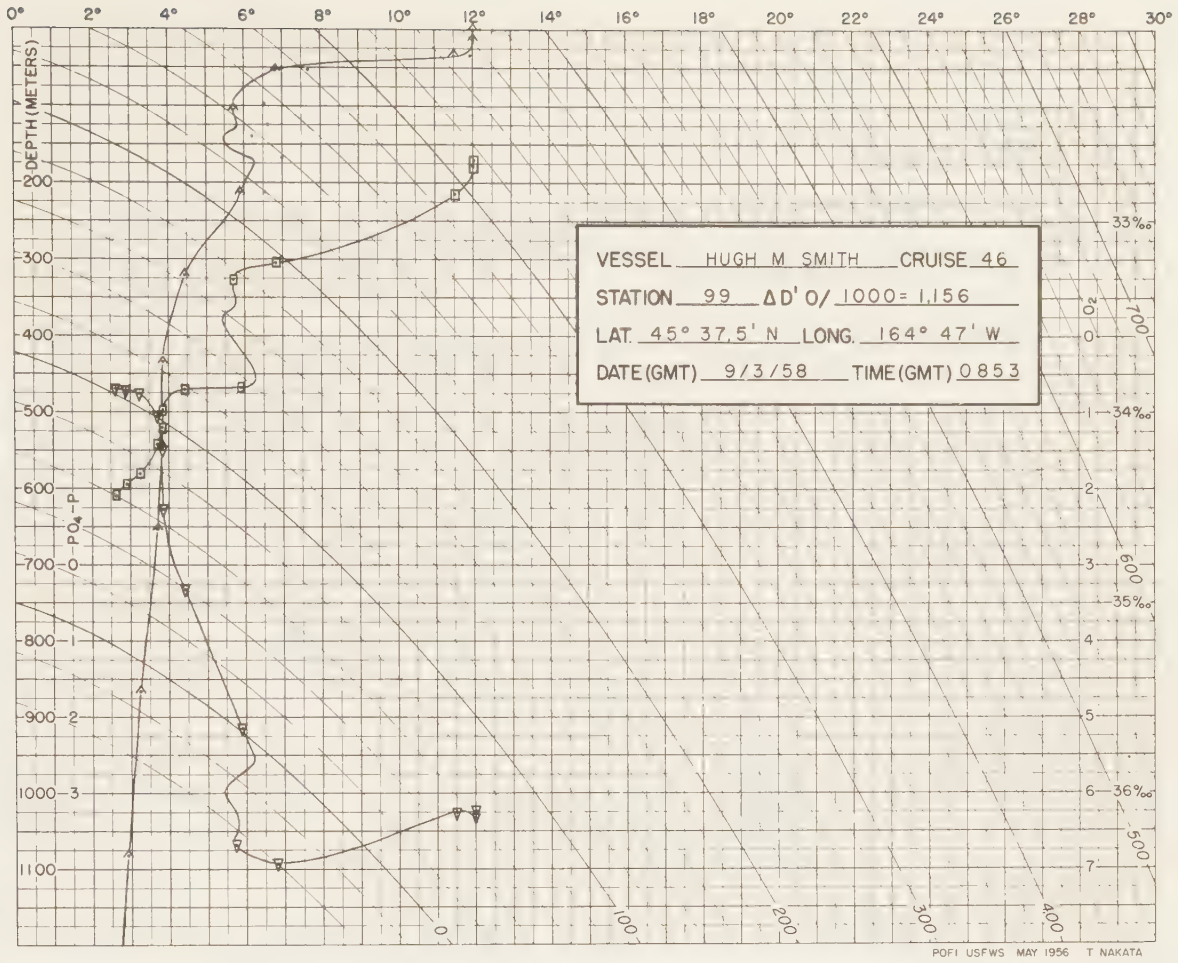
2/ Indicates H_2S precipitate in salinity sample.


VESSEL HUGH M SMITH CRUISE 46
STATION 98 ΔD' O/1000=1.098
LAT. 46° 34' N LONG. 164° 44' W
DATE(GMT) 9/2/58 TIME(GMT) 0420
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: 45, cloud coverage: 9. Wind: 240°, 14 kts. Sea: 3-5 ft. Wire angle: 27°.
BT slide: 312. Dry bulb: 55.0°F. Wet bulb: 55.0°F. Barometric pressure: 1009 mbs.

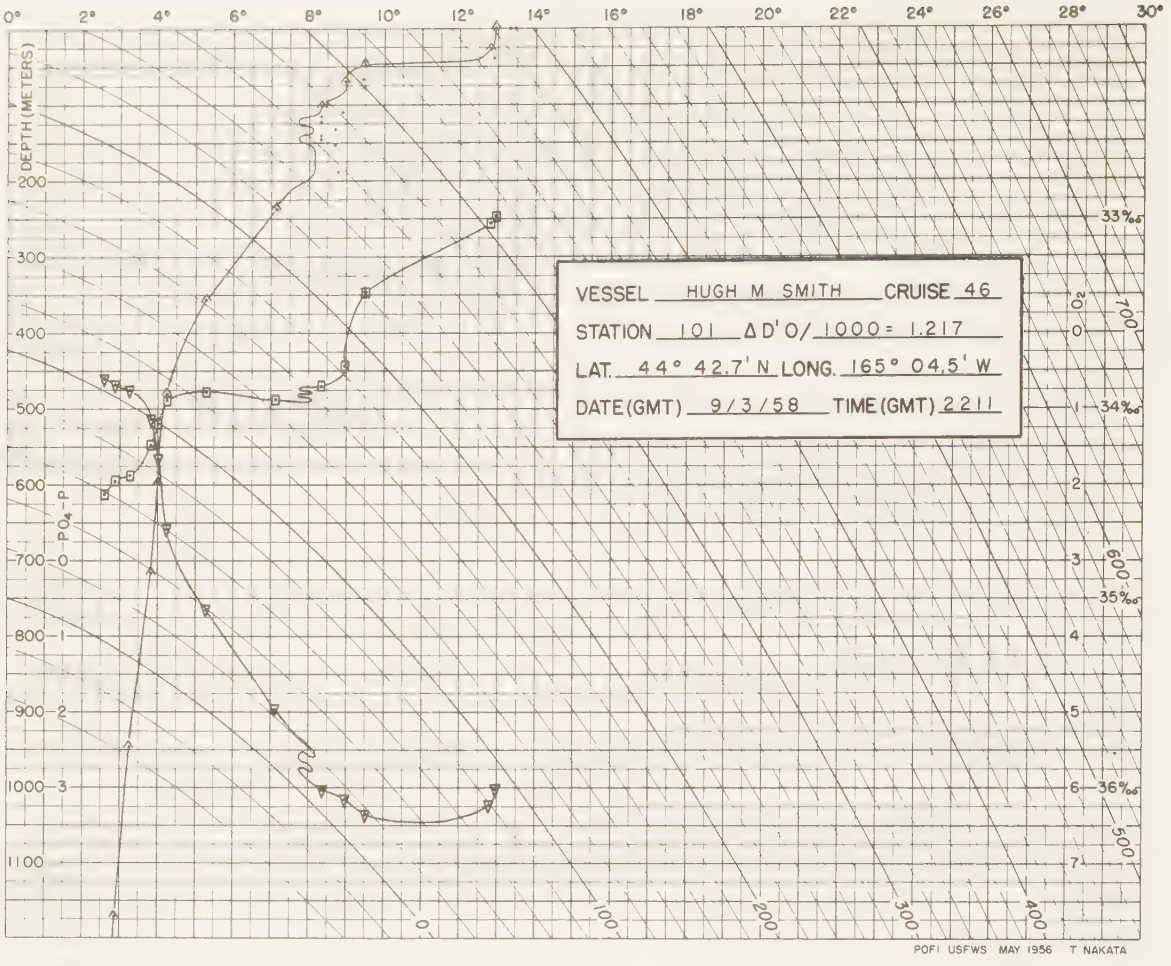
Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	11.38	32.76	297.8	6.21	1.32
14	11.40	32.77	297.3	6.26	1.32
28	10.80	32.89	278.4	6.36	1.32
50	6.32	33.13	196.2	6.98	1.32
100	5.22	33.26 2/	173.6	6.69	1.49
201	5.01	33.93 Q	121.1	4.13 Q	2.30
301	3.99	33.90	112.9	2.78	1.82
407	3.72	33.96	105.8	2.01	2.10
509	3.64	34.08	96.1	1.22	2.82
612	3.52	34.17	88.3	1.04	2.41
816	3.24	34.29	76.7	0.75	3.00
1027	2.89	34.40	65.3	0.63	2.82
1231	2.63	34.45	59.4	0.71	2.14

2/ Indicates H_2S precipitate in salinity sample.


VESSEL HUGH M SMITH CRUISE 46
STATION 99 ΔD' O/ 1000= 1.156
LAT. 45° 37.5' N LONG. 164° 47' W
DATE (GMT) 9/3/58 TIME (GMT) 0853
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T. NAKATA

Weather: 65, cloud coverage: 9. Wind: 230°, 22 kts. Sea: 3-5 ft. Wire angle: 25°.
BT slide: 319. Dry bulb: 55.8°F. Wet bulb: 55.0°F. Barometric pressure: 1012 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	12.01	32.68	314.9	6.23	1.16
14	12.00	32.71	312.4	6.32	0.70
34	11.52	32.86	292.9	6.24	1.00
53	6.82	33.22	195.4	6.92	1.08
106	5.71	33.31	175.3	6.68	1.32
213	5.88	33.87	135.3	5.13	1.48
321	4.43	33.88	119.0	3.32	1.82
434	3.85	33.99	104.8	2.27	2.20
543	3.82	34.08	97.8	1.49	2.30
652	3.70	34.17	89.8	1.04	2.73
866	3.24	34.32	74.4	0.75	2.82
1081	2.89	34.38	66.7	0.71	2.82
1286	2.63	34.44	60.2	0.69	2.91


VESSEL HUGH M SMITH CRUISE 46
STATION 101 Δ D' O/ 1000 = 1.217
LAT. 44° 42.7' N LONG. 165° 04.5' W
DATE (GMT) 9/3/58 TIME (GMT) 2211
DEPTH (METERS)
PO4-P
POF/ USFWS MAY 1956 T NAKATA

Weather: 01, cloud coverage: 6. Wind: 200°, 22 kts. Sea: 5-8 ft. Wire angle: 05°.
BT slide: 323. Dry bulb: 61.5°F. Wet bulb: 58.5°F. Barometric pressure: 1008 mbs.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	12.94	32.98	309.8	6.02	1.00
27	12.81	33.02	304.5	6.23	1.00
48	9.52	33.39	220.9	6.35	1.32
70	8.96	33.77	184.2	6.15	1.32
102	8.35	33.88	167.1	6.02	1.48
237	7.10	33.95	144.8	4.97	1.48
356	5.27	33.91	125.3	3.64	1.56
480	4.25	33.95	111.8	2.57	2.82
598	4.00	34.08	99.5	1.65	1.82
717	3.81	34.19	89.4	1.13	3.17
946	3.25	34.35	72.2	0.75	3.00
1171	2.86	34.38	66.5	0.68	3.17
1382	2.59	34.45	59.1	0.60	3.09

Table 14.--Summary of observations at bathythermograph casts (U. S. Navy Hydrographic Office 1956), Hugh M. Smith cruise 46

Ser. No.	Time (GCT)	Date, 1958	Latitude N.	Longitude W.	Bkt. temp. (°F.)	Wind		Air temp.		Barometer, (mb.)	Weather	Clouds		Visibility	Sea	Swell		Surf. sal. (‰)
						Dir. (°T)	Force, (kt)	Dry bulb (°F.)	Wet bulb (°F.)			Type	Cover			Dir. (°T.)	Amt.	
1	0450	7/22	21°11'	158°19'	79.0	12	18	77.2	71.0	1016	02	8,2	2	9	2	10	2	
2	0625	7/22	21°11'	158°19'	78.9	12	18	79.4	72.8	1016	02	8,2	2	9	2	10	2	
3	0717	7/22	21°11'	158°19'	78.8	13	12	77.0	71.2	1017	00	-	-	9	2	--	-	
4	0810	7/22	21°11'	158°19'	79.0	13	14	77.8	70.3	1017	00	-	-	9	2	--	-	
5	0940	7/22	21°11'	158°19'	78.9	01	09	76.8	70.8	1017	00	-	-	9	2	--	-	
6	1040	7/22	21°11'	158°19'	78.7	02	09	77.8	71.2	1017	00	-	-	9	2	--	-	
7	1150	7/22	21°11'	158°19'	78.6	08	12	77.2	70.9	1017	00	-	-	9	2	--	-	
8	1305	7/22	21°11'	158°19'	78.6	08	12	77.2	70.9	1017	00	-	-	9	2	--	-	
9	1500	7/22	21°34'	158°25'	78.8	--	--	76.8	70.0	1017	00	-	-	9	2	--	-	
10	1800	7/22	22°02'	158°28'	77.9	07	15	76.7	71.8	1018	50	0,7	9	7	3	06	1	
11	2100	7/22	22°30'	158°30'	77.5	07	15	79.5	72.5	1018	02	2,8	2	9	3	07	1	
12	2400	7/22	22°59'	158°31'	78.4	07	15	78.8	72.1	1018	02	2,8	2	9	3	06	1	
13	0300	7/23	23°25'	158°32'	77.9	07	15	79.5	72.2	1018	02	8	1	9	3	06	1	
14	0540	7/23	23°55'	158°32'	77.4	06	18	76.1	70.6	1018	02	8	5	9	3	05	2	
15	0725	7/23	23°56'	158°33'	77.7	06	16	76.2	70.8	1019	02	x	x	9	3	05	1	
16	1200	7/23	24°33'	158°30'	77.3	07	15	75.2	70.6	1019	02	x	x	9	3	xx	x	
17	1500	7/23	25°03'	158°32'	76.8	06	11	74.9	71.0	1016	00	x	x	9	3	xx	x	
18	1730	7/23	25°28'	158°34'	75.4	05	10	73.0	69.7	1020	03	7,8	6	7	3	06	1	
19	1915	7/23	25°34'	158°34'	75.6	06	10	76.8	71.9	1020	51	8	9	7	2	xx	x	
20	2235	7/23	26°06'	158°37'	75.6	07	14	76.8	71.4	1017	02	8	4	9	2	07	3	
21	0200	7/24	26°32'	158°38'	76.4	08	15	78.7	71.2	1019	01	4,8	3	9	2	05	2	
22	0545	7/24	27°07'	158°38'	74.8	07	14	75.3	69.8	1020	02	8	2	9	3	06	1	
23	0645	7/24	27°08'	158°38'	75.0	07	14	75.3	69.8	1020	02	8	2	9	3	06	1	
24	1130	7/24	27°44'	158°36'	75.5	07	12	74.8	69.7	1020	00	x	x	9	3	07	1	
25	1500	7/24	28°18'	158°40'	74.8	09	15	74.2	69.6	1019	01	6	2	9	2	xx	x	
26	1750	7/24	28°45'	158°44'	74.3	10	10	75.9	70.0	1021	02	8	4	9	2	12	1	
27	1900	7/24	28°47'	158°44'	74.2	10	10	75.9	70.0	1021	02	8	4	9	2	12	1	
28	2245	7/24	29°28'	158°51'	74.8	11	07	77.0	69.5	1021	02	6	6	9	2	12	1	
29	0240	7/25	30°02'	158°54'	76.0	12	10	77.8	70.0	1019	02	5	2	9	2	12	1	
30	0600	7/25	30°34'	158°56'	75.5	12	10	75.8	67.6	1020	02	6	2	9	2	12	1	
31	0710	7/25	30°36'	158°56'	75.5	12	11	75.1	68.5	1020	02	6	2	92	2	12	1	
32	1220	7/25	31°06'	158°52'	74.7	16	10	74.3	69.1	1019	00	x	x	9	2	xx	x	
33	1600	7/25	31°53'	158°52'	74.0	26	07	74.5	69.0	1018	01	4	1	9	1	26	1	
34	1900	7/25	32°25'	158°50'	74.5	19	13	75.0	69.1	1018	02	4,8	4	9	2	15	1	
35	2015	7/25	32°27'	158°51'	75.3	18	14	75.0	69.1	1018	02	4,8	4	9	2	15	1	
36	2345	7/25	33°03'	158°50'	75.4	19	17	77.0	71.5	1017	02	4,8	3	9	2	15	1	
37	0330	7/26	33°34'	158°51'	75.3	19	14	75.9	71.0		02	8,4	3	9	2	18	1	
38	0650	7/26	34°01'	158°54'	74.7	18	20	75.2	71.2	1016	00	x	x	9	3	xx	x	
39	0755	7/26	34°03'	158°54'	74.7	18	20	75.2	71.2	1016	00	x	x	9	3	xx	x	
40	1230	7/26	34°36'	158°56'	73.3	18	20	74.0	70.9	1015	02	x	x	9	3	21	1	

Table 14.--Summary of observations at bathythermograph casts (U. S. Navy Hydrographic Office 1956), Hugh M. Smith cruise 46 (cont'd)

Ser. No.	Time (GCT)	Date, 1958	Latitude N.	Longitude W.	Bkt. temp. (°F.)	Wind		Air temp.		Barometer (mb.)	Weather	Clouds		Visibility	Sea	Swell		Surf. sal. (‰)
						Dir. (°T.)	Force (kt.)	Dry bulb (°F.)	Wet bulb (°F.)			Type	Cover			Dir. (°T.)	Amt.	
41	1600	7/26	35°12'	158°57'	73.8	21	20	73.8	71.7	1015	50	7	8	7	4	21	1	34.23
42	1915	7/26	35°44'	158°58'	73.0	02	11	75.0	70.4	1015	21	4,5	5	9	4	21	1	
43	2015	7/26	35°46'	158°58'	73.2	02	13	74.2	69.9	1015	21	4,5,8	5	9	4	21	1	
44	2345	7/26	36°22'	159°01'	72.3	24	13	74.5	71.4	1016	01	4,8	5	9	3	21	1	
45	0350	7/27	36°58'	159°05'	72.4	23	08	74.3	70.9	1015	03	6,8	7	9	3	22	1	34.25
46	0645	7/27	37°24'	159°08'	71.8	21	09	72.5	69.9	1016	01	1,4	3	9	2	21	1	
47	0840	7/27	37°25'	159°09'	71.7	21	09	72.8	70.1	1017	03	4,8	7	9	2	21	1	
48	1230	7/27	37°47'	159°11'	70.4	29	14	70.0	66.4	1018	xx	xx	x	9	3	x	x	34.22
49	1600	7/27	38°16'	159°12'	70.1	29	12	68.9	64.3	1018	03	8	7	9	3	29	2	34.37
50	1850	7/27	38°34'	159°13'	69.8	25	14	69.5	65.9	1019	03	8,4	8	9	2	29	2	
51	2005	7/27	38°35'	159°13'	69.9	25	14	69.5	65.9	1021	50	4	8	9	2	29	2	
52	2345	7/27	38°58'	159°14'	67.7	28	16	67.6	67.3	1021	50	4	8	9	3	29	2	34.12
53	0330	7/28	39°19'	159°14'	67.4	29	11	69.2	65.9	1021	20	6,8	6	9	3	29	2	34.03
54	0645	7/28	39°40'	159°15'	67.1	30	14	67.3	63.5	1022	02	6	7	9	3	29	2	
55	0815	7/28	39°42'	159°15'	66.8	30	14	67.9	64.2	1022	00	x	x	9	x	xx	x	
56	1550	7/28	39°49'	159°18'	65.2	28	15	66.5	65.0	1024	51	6	8	7	3	30	2	
57	1900	7/28	40°10'	159°19'	65.3	25	18	67.0	65.0	1025	03	0	7	9	3	29	3	34.04
58	2200	7/28	40°24'	159°18'	64.9	27	14	66.9	65.0	1026	20	0	7	9	3	29	1	33.98
59	0100	7/29	40°43'	159°18'	63.5	26	08	66.1	63.8	1025	02	00	5	9	2	30	1	33.80
60	0405	7/29	40°49'	159°31'	63.1	24	16	65.0	64.0	1025	51	0	8	9	3	23	1	33.92
61	0600	7/29	40°49'	159°38'	63.7	28	17	66.0	64.3	1025	50	0	9	5	2		1	
62	0830	7/29	40°49'	159°38'	63.5	27	16	65.2	64.5	1027	50	x	x	x	x	xx	x	
63	1700	7/29	40°48'	159°39'	63.3	01	08	61.8	59.9	1027	20	0	8	7	2	28	1	
64	1810	7/29	40°48'	159°39'	63.2	01	08	62.7	60.3	1027	20	0	8	7	2	28	1	
65	2045	7/29	41°03'	159°39'	62.3	36	12	60.2	57.5	1029	02	0	9	5	2	30	1	
66	2345	7/29	41°17'	159°39'	61.8	31	16	59.5	55.0	1029	01	4	3	9	2	30	2	33.73
67	0230	7/30	41°30'	159°39'	60.2	31	14	61.0	54.5	1030	01	4	1	9	2	30	2	33.62
68	0630	7/30	41°20'	159°56'	61.3	35	08	61.0	56.0	1030	03	8	7	9	2	30	2	
69	1645	7/30	41°21'	159°59'	61.5	32	02	60.3	54.8	1031	02	8	7	7	2	30	1	
70	1830	7/30	41°35'	159°58'	60.1	29	09	59.9	54.3	1031	02	8	8	9	1	30	1	33.68
71	2200	7/30	41°52'	159°57'	59.6	32	13	60.8	56.2	1031	02	8	8	9	2	30	1	33.68
72	0100	7/31	42°07'	159°57'	59.7	32	11	58.0	52.2	1030	02	8	8	8	2	33	1	33.71
73	0400	7/31	41°59'	159°41'	59.5	31	06	58.3	52.8	1030	02	8	9	8	2	30	1	33.65
74	0625	7/31	41°46'	159°24'	58.8	31	06	58.0	53.3	1030	02	8	9	8	2	30	1	
75	0740	7/31	41°46'	159°24'	58.7	31	06	57.9	52.9	1030	02	8	9	8	2	30	1	
76	1700	7/31	41°45'	159°22'	58.6	32	06	56.9	52.2	1031	02	8	9	8	2	30	1	33.50
77	2045	7/31	41°25'	158°57'	59.8	35	09	56.7	53.5	1030	53	0	8	7	2	36	2	33.69
78	2205	7/31	41°19'	158°48'	61.0	31	06	57.5	54.0	1031	50	0	8	8	2	31	2	33.69
79	0050	8/1	41°08'	158°36'	61.8	10	07	59.5	55.3	1030	02	0	8	9	0	00	1	33.74
80	0330	8/1	40°59'	158°27'	62.4	10	06	59.3	54.5	1030	02	6	8	9	2	00	1	33.70

Table 14.--Summary of observations at bathythermograph casts (U. S. Navy Hydrographic Office 1956), Hugh M. Smith cruise 46 (cont'd)

Ser. No.	Time (GCT)	Date, 1958	Latitude N.	Longitude W.	Bkt. temp. (°F.)	Wind		Air temp.		Barometer (mb.)	Weather	Clouds		Visibility	Sea	Swell		Surf. sal. (‰)
						Dir. (°T.)	Force (kt.)	Dry bulb (°F.)	Wet bulb (°F.)			Type	Cover			Dir. (°T.)	Amt.	
81	0615	8/1	41°09'	158°24'	61.4	10	07	57.2	53.9	1030	02	6	8	9	2	00	1	
82	0735	8/1	41°09'	158°24'	61.4	10	06	57.3	53.9	1030	02	6	8	9	2	00	1	
83	1715	8/1	41°06'	158°22'	61.5	34	12	58.1	55.2	1031	20	0	8	9	3	34	2	
84	1930	8/1	41°20'	158°22'	60.5	35	10	57.0	52.0	1032	02	0	8	9	3	34	2	33.61
85	2215	8/1	41°34'	158°22'	61.2	03	09	61.2	56.8	1032	02	0	8	9	2	33	2	33.51
86	0010	8/2	41°46'	158°22'	61.9	03	06	59.6	54.0	1032	02	0	8	9	2	33	2	33.62
87	0315	8/2	42°04'	158°22'	61.0	00	05	59.1	53.7	1032	02	0	8	9	1	33	2	33.60
88	0630	8/2	42°19'	158°22'	59.8	35	08	54.9	53.1	1032	02	0	8	9	1	34	2	
89	0740	8/2	42°19'	158°22'	59.8	35	08	54.5	52.2	1032	00	x	x	9	1	xx	x	
90	1735	8/2	42°20'	158°23'	59.2	35	05	54.1	50.1	1032	02	6	8	8	2	32	2	
91	1930	8/2	42°32'	158°26'	58.0	25	12	54.5	51.2	1032	02	6	9	8	2	32	2	33.57
92	2200	8/2	42°47'	158°29'	57.6	30	13	55.0	52.0	1031	02	6	9	8	3	32	1	33.46
93	0030	8/3	43°02'	158°32'	57.2	29	17	55.0	53.0	1030	02	0	8	8	3	30	2	33.35
94	0330	8/3	43°18'	158°36'	57.0	29	17	55.3	52.8	1028	02	0	8	8	4	31	2	33.32
95	0625	8/3	43°10'	158°47'	56.7	28	13	55.3	53.0	1028	02	0	8	8	3	31	1	
96	0745	8/3	43°10'	158°47'	56.5	28	17	54.0	52.0	1028	50	0	8	8	3	31	1	
97	1740	8/3	43°12'	158°44'	56.4	27	22	55.3	53.8	1025	20	0	8	8	4	31	1	
98	1930	8/3	43°24'	158°46'	56.0	26	24	56.0	53.9	1025		0	8	8	4	30	1	33.25
99	2230	8/3	43°43'	158°48'	56.0	26	24	55.5	54.9	1023	20	0	9	6	5	30	4	
100	0030	8/4	43°54'	158°49'	55.7	26	24	55.5	54.7	1022	50	0	9	8	5	30	3	33.22
101	0330	8/4	44°10'	158°52'	55.3	28	22	55.5	54.5	1021	50	0	9	6	5	30	3	33.25
102	0530	8/4	44°16'	158°57'	55.0	25	22	55.6	54.7	1020	63	0	9	6	5	27	4	
103	0630	8/4	44°16'	158°57'	55.0	25	25	55.6	54.7	1020	63	0	9	6	5	27	4	
104	1600	8/4	43°54'	159°38'	54.5	24	23	56.1	55.0	1017	20	0	9	5	5	27	4	33.20
105	1900	8/4	43°49'	159°54'	54.2	25	22	56.0	59.8	1020	02	0	9	6	5	27	4	
106	2020	8/4	43°49'	159°55'	54.2	25	22	56.0	55.0	1020	02	0	9	6	5	27	4	
107	2200	8/4	43°59'	159°46'	54.6	26	22	56.3	55.3	1019	02	0	9	5	5	27	4	33.19
108	0030	8/5	44°15'	159°39'	54.4	27	21	56.3	55.0	1019	02	0	9	5	5	27	4	33.22
109	0330	8/5	44°34'	159°29'	54.4	28	21	53.9	54.1	1018	02	0	9	5	5	28	4	33.26
110	0515	8/5	44°48'	159°23'	54.2	28	21	54.2	51.9	1018	02	0	8	7	5	28	4	33.27
111	0700	8/5	45°00'	159°23'	53.7	29	17	53.3	51.5	1018	51	0	8	x	5	xx	4	
112	0810	8/5	45°02'	159°23'	53.6	29	16	53.5	51.5	1019	20	0	8	x	5	xx	4	
113	1105	8/5	45°14'	159°33'	52.4	30	22	53.7	51.3	1019	00	x	x	x	4	xx	x	33.18
114	1245	8/5	45°30'	159°35'	52.1	30	20	52.0	50.0	1019	02	x	x	x	4	xx	4	33.13
115	1445	8/5	45°46'	159°38'	52.2	31	19	50.7	48.9	1019	02	0	8	6	4	xx	4	33.12
116	1700	8/5	46°06'	159°40'	51.4	28	19	51.9	50.0	1022	02	0	8	6	3	27	4	
117	1810	8/5	46°08'	159°40'	51.4	28	16	51.4	50.0	1022	02	0	8	7	3	27	4	
118	2000	8/5	46°18'	159°42'	51.4	30	16	53.1	52.0	1022	02	0	8	8	3	27	4	33.11
119	2125	8/5	46°30'	159°44'		31	15	52.0	50.5	1023	02	0	8	8	3	27	4	33.03
120	2300	8/5	46°43'	159°45'	50.8	30	15	51.8	50.0	1023	01	0	6	8	3	27	4	33.00

Table 14.--Summary of observations at bathythermograph casts (U. S. Navy Hydrographic Office 1956), Hugh M. Smith cruise 46 (cont'd)

Ser. No.	Time (GCT)	Date, 1958	Latitude N.	Longitude W.	Bkt. temp. (°F.)	Wind		Air temp.		Barometer (mb.)	Weather	Clouds		Visibility	Sea	Swell		Surf. sal. (‰)
						Dir. (°T.)	Force (kt.)	Dry bulb (°F.)	Wet bulb (°F.)			Type	Cover			Dir. (°T.)	Amt.	
121	0100	8/6	47°02'	159°44'	50.8	30	12	52.2	50.0	1023	03	0	8	6	3	29	4	
122	0210	8/6	47°03'	159°44'	51.0	30	12	52.0	50.0	1024	50	0	8	7	3	29	4	
123	0345	8/6	47°18'	159°44'	51.2	29	15	51.4	50.0	1023	16	0	8	7	3	29	1	32.96
124	0530	8/6	47°35'	159°43'	50.8	27	17	51.9	50.0	1024	16	0	8	6	3	29	1	32.98
125	0715	8/6	47°49'	159°42'	50.7	30	13	51.2	50.0	1025	00	x	x	6	3	xx	x	33.01
126	0900	8/6	48°04'	159°42'	49.4	28	13	50.5	49.4	1025	02	0	8	x	3	xx	x	
127	1025	8/6	48°06'	159°42'	49.4	28	13	50.5	49.4	1025	02	0	8	x	2	xx	x	
128	1500	8/6	49°40'	159°47'	49.1	31	12	49.8	49.0	1025	02	0	8	6	2	29	1	32.88
129	1830	8/6	49°12'	159°46'	48.7	28	13	49.9	49.1	1025	43	fog	9	6	2	28	1	32.84
130	2115	8/6	49°35'	159°45'	48.8	28	05	51.0	49.0	1025	02	x	8	7	2	28	1	
131	2225	8/6	49°36'	159°45'	49.2	28	05	51.0	49.0	1025	02	0	8	7	2	28	1	
132	0100	8/7	49°59'	159°47'	49.9	34	08	52.9	50.1	1025	10	0	8	4	2	29	2	
133	0410	8/7	50°26'	159°47'	49.0	34	18	49.8	46.8	1026	02	0	8	7	2	30	2	32.72
134	0720	8/7	50°53'	159°48'	48.7	32	14	49.9	47.4	1028	02	0	8	8	2	30	2	
135	0825	8/7	50°56'	159°48'	48.6	32	14	48.8	47.1	1028	02	0	8	8	2	30	2	
136	1245	8/7	51°30'	159°51'	48.9	33	19	50.0	48.0	1028	02	0	8	8	2	30	2	
137	1550	8/7	51°59'	159°53'	49.0	30	22	48.5	47.7	1027	02	0	8	9	4	30	2	
138	1945	8/7	52°33'	159°56'	49.3	32	20	50.6	49.7	1028	02	0	8	9	4	31	2	
139	2130	8/7	52°36'	159°56'	49.4	32	19	50.3	48.7	1028	02	0	8	9	4	31	2	
140	0045	8/8	53°06'	159°56'	50.1	29	20	50.7	49.7	1027	01	0	7	9	4	30	2	
141	0345	8/8	53°35'	159°56'	51.0	30	18	51.2	50.0	1026	03	0	8	8	3	30	2	
142	0620	8/8	53°59'	159°55'	52.8	27	18	52.8	50.7	1025	02	0	8	8	3	30	2	
143	0730	8/8	54°00'	159°55'	52.3	--	--	51.5	50.0	1027	02	x	x	x	3	xx	x	
144	1200	8/8	53°41'	160°14'	52.0	21	21	52.5	51.0	1022	02	x	x	8	x	xx	x	
145	1605	8/8	53°11'	160°41'	51.0	24	22	53.7	53.4	1018	45	x	9	2	3	26	1	
146	1930	8/8	52°44'	161°04'	50.7	25	22	54.5	53.3	1018	45	x	9	2	3	26	1	32.75
147	2305	8/8	52°16'	161°28'	50.0	25	20	54.6	53.0	1019	10	x	9	2	3	26	1	
148	0230	8/9	51°49'	161°52'	49.6	25	22	54.0	52.8	1019	45	x	9	2	3	26	4	
149	0600	8/9	51°21'	162°14'	49.7	26	20	53.0	51.9	1019	45	x	9	2	3	26	4	32.69
150	0930	8/9	50°57'	162°35'	49.6	25	20	52.3	51.0	1019	45	x	9	2	3	26	4	
151	1200	8/9	50°38'	162°50'	49.1	26	18	52.5	51.4	1020	45	x	9	0	4	xx	x	
152	1530	8/9	50°16'	163°16'	49.3	27	20	53.1	51.5	1021	43	x	9	3	4	29	3	
153	1940	8/9	50°15'	164°12'	49.0	25	20	53.6	52.5	1025	45	x	9	2	3	27	3	32.76
154	2230	8/9	50°13'	164°53'	49.6	25	19	53.8	52.0	1023	42	x	9	6	3	27	3	
155	0200	8/10	50°10'	165°39'	49.7	28	12	52.7	51.0	1024	47	x	9	2	2	28	1	32.68
156	0530	8/10	50°07'	166°24'	49.8	27	18	52.7	52.0	1025	47	x	9	1	3	26	1	
157	0900	8/10	50°03'	167°08'	49.8	28	15	53.8	51.5	1025	43	x	9	3	3	28	1	32.64
158	1230	8/10	50°00'	167°54'	49.7	24	16	52.1	51.3	1025	45	x	9	1	3	xx	x	
159	1600	8/10	49°56'	168°40'	49.7	22	20	52.9	52.0	1023	01	0	7	7	3	25	3	32.60
160	1930	8/10	49°53'	169°22'	50.0	24	20	53.2	52.8	1021	47	x	9	1	3	xx	x	

Table 14.--Summary of observations at bathythermograph casts (U. S. Navy Hydrographic Office 1956), Hugh M. Smith cruise 46 (cont'd)

Ser. No.	Time (GCT)	Date, 1958	Latitude N.	Longitude W.	Bkt. temp. (°F.)	Wind		Air temp.		Barometer (mb.)	Weather	Clouds		Visibility	Sea	Swell		Surf. sal. (‰)
						Dir. (°T.)	Force (kt.)	Dry bulb (°F.)	Wet bulb (°F.)			Type	Cover			Dir. (°T.)	Amt.	
161	2305	8/10	49°50'	170°11'	50.0	22	27	55.2	53.9	- -	45	x	9	2	4	26	5	32.67
162	0230	8/11	49°46'	170°53'	50.3	22	22	53.1	52.8	1018	45	x	9	2	4	25	5	
163	0600	8/11	49°45'	171°36'	50.1	22	20	54.4	53.2	1016	45	x	9	3	4	26	5	32.65
164	1015	8/11	49°45'	172°24'	50.0	25	22	55.0	52.3	1016	01	x	x	6	4	xx	x	
165	1300	8/11	49°45'	173°00'	50.0	25	22	52.7	50.8	1016	01	x	x	7	4	26	4	32.57
166	1630	8/11	49°48'	173°41'	50.1	24	22	52.7	50.5	1014	01	1,8	4	9	4	25	4	
167	1900	8/11	50°00'	174°00'	50.0	25	24	54.3	51.0	1013	01	1	1	9	4	26	3	
168	2020	8/11	50°00'	174°03'	49.9	25	23	53.0	50.3	1014	02	1	1	9	4	26	4	
169	2220	8/11	49°47'	174°10'	50.4	26	23	52.4	51.6	1015	47	x	9	4	4	24	4	32.49
170	0000	8/12	49°33'	174°18'	50.1	26	21	53.5	52.0	1016	47	x	9	4	4	24	4	
171	0145	8/12	49°18'	174°27'	50.4	28	24	52.8	51.7	1017	45	x	9	5	5	24	4	32.67
172	0330	8/12	49°04'	174°36'	50.3	28	22	52.1	50.6	1019	40	x	9	5	4	24	4	
173	0440	8/12	49°02'	174°36'	50.5	28	22	52.1	50.6	1019	40	x	9	5	4	26	1	
174	0615	8/12	48°48'	174°41'	50.7	29	17	52.7	51.2	1020	40	x	9	6	3	30	3	32.70
175	0745	8/12	48°34'	174°42'	50.9	27	17	52.8	51.5	1022	02	x	9	5	4	xx	x	32.74
176	0930	8/12	48°18'	174°44'	51.2	28	15	53.0	51.8	1022	47	x	9	2	4	29	4	32.83
177	1055	8/12	48°05'	174°45'	51.7	29	18	52.5	51.8	1025	47	x	9	1	3	xx	x	
178	1200	8/12	48°03'	174°45'	51.7	29	18	52.5	51.8	1025	47	x	9	1	3	xx	x	
179	1445	8/12	47°50'	174°52'	52.0	26	12	53.5	51.9	1023	01	x	x	7	3	xx	x	33.00
180	1625	8/12	47°34'	174°53'	52.2	26	10	54.1	52.2	1024	02	1	5	9	2	20	1	33.04
181	1900	8/12	47°14'	174°56'	52.5	28	10	54.8	52.9	1024	02	6	2	9	2	26	1	
182	2000	8/12	47°13'	174°56'	52.7	28	07	56.4	54.0	1024	02	6	2	9	2	26	1	
183	2225	8/12	46°57'	174°59'	53.1	28	11	57.4	54.1	1025	02	6	1	9	2	28	1	33.03
184	0030	8/13	46°44'	174°57'	53.2	30	10	55.5	54.4	1025	02	7	7	8	2	28	1	32.97
185	0305	8/13	46°27'	174°58'	54.3	28	09	58.7	55.5	1025	01	0,2	2	9	2	29	1	32.93
186	0515	8/13	46°12'	174°56'	54.6	28	10	55.5	54.0	1026	47	x	9	2	2	28	1	
187	0620	8/13	46°12'	174°56'	54.7	28	10	55.0	53.9	1026	42	6	4	9	2	28	1	
188	1740	8/13	46°10'	174°56'	54.4	31	08	52.9	51.9	1027	40	0	8	8	2	28	1	
189	1900	8/13	46°02'	174°56'	54.6	33	07	53.5	52.3	1028	40	0	8	8	2	28	1	33.04
190	2120	8/13	45°48'	174°56'	54.7	34	05	54.1	57.0	1028	40	0	8	8	1	34	1	33.05
191	2340	8/13	45°32'	174°56'	55.8	28	02	58.2	54.5	1028	02	8	6	7	2	28	1	33.04
192	0200	8/14	45°18'	174°55'	57.0	--	00	57.8	54.6	1028	02	8	8	7	2	28	1	33.05
193	0415	8/14	45°04'	174°54'	56.8	28	03	57.4	55.2	1027	02	6	8	8	1	28	1	33.07
194	0530	8/14	45°04'	174°54'	56.2	32	06	56.3	55.0	1027	40	0	8	5	2	26	2	
195	0630	8/14	45°12'	174°53'	56.5	32	06	56.5	55.0	1027	40	0	8	5	2	26	2	
196	1740	8/14	45°08'	174°50'	55.9	32	06	57.0	56.1	1026	40	0	8	7	2	26	2	
197	0230	8/15	45°08'	174°47'	56.7	26	08	60.0	54.2	1024	47	x	9	2	1	xx	2	34.41
198	0445	8/15	44°53'	174°47'	57.2	27	12	60.0	57.7	1024	40	0	8	6	2	34	2	33.10
199	0655	8/15	44°39'	174°48'	57.8	27	10	59.8	58.2	1024	47	0	9	4	1	29	1	33.13
200	1745	8/15	44°30'	174°39'	57.2	25	24	58.5	58.0	1016	45	x	9	4	3	24	3	

Table 14.--Summary of observations at bathythermograph casts (U. S. Navy Hydrographic Office 1956), Hugh M. Smith cruise 46 (cont'd)

Ser. No.	Time (GCT)	Date, 1958	Latitude N.	Longitude W.	Bkt. temp. (°F.)	Wind		Air temp.		Barometer (mb.)	Weather	Clouds		Visibility	Sea	Swell		Surf. sa. (‰)
						Dir. (°T.)	Force (kt.)	Dry bulb (°F.)	Wet bulb (°F.)			Type	Cover			Dir. (°T.)	Amt.	
201	1900	8/15	44°24'	174°40'	57.3	01	22	59.0	57.2	1016	45	x	9	5	3	24	3	
202	2115	8/15	44°23'	174°41'	57.1	01	19	59.0	57.2	1016	45	x	9	5	3	24	3	
203	2320	8/15	44°14'	174°43'	57.9	29	22	59.5	58.2	1016	02	6	9	8	4	27	3	33.26
204	0130	8/15	44°00'	174°45'	58.1	29	21	59.0	57.0	1017	02	6	7	8	3	27	3	33.41
205	0350	8/16	43°44'	174°47'	58.7	28	18	59.9	57.6	1018	02	6	8	7	3	28	3	33.37
206	0525	8/16	43°29'	174°48'	59.1	31	19	58.9	57.2	1019	40	6	8	2	3	24	4	
207	0730	8/16	43°29'	174°48'	59.0	32	17	58.9	57.2	1019	40	0	8	5	03	25	4	
208	1810	8/16	43°22'	174°44'	58.9	30	19	61.0	60.0	1016	40	0	8	4	03	29	3	
209	0320	8/17	43°22'	174°43'	59.1	26	09	59.3	58.9	1015	40	x	9	2	3	30	3	
210	0745	8/17	43°22'	174°43'	58.8	26	07	60.8	59.5	1013	53	x	9	3	2	29	1	
211	1745	8/17	43°28'	174°40'	58.8	21	09	60.1	60.0	1006	51	x	9	4	2	21	1	33.27
212	1900	8/17	43°20'	174°45'	59.3	00	00	61.8	61.0	1005	59	x	9	3	1	24	1	33.33
213	2130	8/17	43°06'	174°52'	60.3	32	05	65.1	63.8	1005	43	x	9	3	1	26	1	33.42
214	0000	8/18	42°51'	175°00'	61.4	31	12	63.7	63.0	1005	49	x	9	3	2	30	1	33.49
215	0310	8/18	42°38'	175°03'	61.3	31	14	61.5	59.8	1006	20	x	9	7	3	31	3	33.85
216	0500	8/18	42°47'	175°07'	61.0	29	18	60.1	58.9	1006	40	0	8	7	3	29	3	
217	0710	8/18	42°48'	175°08'	61.0	28	17	60.8	58.9	1007	41	0	6	8	3	29	4	
218	2050	8/18	42°46'	175°08'	61.3	00	00	63.2	58.8	1006	01	0,4	1	9	2	28	1	33.50
219	0530	8/19	42°48'	175°02'	61.4	24	16	62.0	60.8	0999	02	0	8	6	3	23	3	
220	1820	8/19	42°48'	175°11'	60.8	35	24	58.0	56.1	1006	20	0	8	5	4	35	4	33.55
221	2100	8/19	42°25'	175°09'	60.2	36	24	59.3	56.7	1012	01	8	7	7	4	35	4	33.63
222	2340	8/19	42°11'	175°02'	60.6	35	23	59.5	55.3	1011	02	0	9	6	5	36	4	33.71
223	0230	8/20	41°54'	175°04'	61.2	35	19	55.5	51.2	1012	02	0	9	8	3	35	4	33.73
224	0520	8/20	41°35'	175°08'	61.7	36	18	58.8	53.9	1015	01	0	8	8	4	35	4	
225	0630	8/20	41°35'	175°08'	61.5	36	18	58.8	53.9	1015	02	0	8	8	4	35	4	
226	1815	8/20	41°28'	175°06'	63.3	26	02	60.0	59.0	1016	02	0	8	8	2	35	1	
227	2110	8/20	41°28'	175°06'	63.2	18	05	61.0	55.0	1015	02	0	8	8	2	35	1	33.96
228	2120	8/20	41°28'	175°07'	63.0	18	06	61.0	55.0	1015	02	0	8	8	2	35	1	33.96
229	2131	8/20	41°30'	175°07'	62.8	18	06	61.3	54.8	1015	50	0	8	8	2	35	1	33.92
230	2143	8/20	41°30'	175°08'	62.5	18	06	61.3	54.8	1015	50	0	8	8	2	35	1	33.91
231	2157	8/20	41°32'	175°08'	62.0	18	08	61.3	54.8	1015	50	0	8	8	2	35	1	33.81
232	2209	8/20	41°32'	175°08'	61.7	18	08	61.3	54.8	1014	50	0	8	8	2	35	1	33.76
233	0415	8/21	41°28'	175°06'	63.9	20	24	64.0	63.5	1004	61	x	9	4	4	19	3	33.94
234	1945	8/22	41°47'	175°02'	60.2	18	03	59.3	52.1	1021	02	6	9	9	1	04	1	
235	2145	8/22	41°33'	175°02'	64.3	--	00	64.8	57.0	1021	02	6	7	8	1	30	1	
236	2315	8/22	41°33'	175°02'	64.8	00	00	65.6	58.0	1021	02	6	7	8	1	30	1	33.98
237	0030	8/23	41°39'	175°06'	62.1	00	00	64.8	56.6	1020	02	6	7	8	1	30	1	
238	0115	8/23	41°43'	175°09'	60.4	00	00	64.0	55.8	1019	03	6	8	8	1	30	1	33.76
239	0250	8/23	41°50'	175°15'	59.9	03	03	62.5	54.2	1019	02	6	8	7	01	04	2	
240	0415	8/23	41°52'	175°16'	60.0	03	05	62.0	55.8	1019	02	6	8	7	01	04	2	

Table 14.--Summary of observations at bathythermograph casts (U. S. Navy Hydrographic Office 1956), Hugh M. Smith cruise 46 (cont'd)

Ser. No.	Time (GCT)	Date, 1958	Latitude N.	Longitude W.	Bkt. temp. (°F.)	Wind		Air temp.		Barometer (mb.)	Weather	Clouds		Visibility	Sea	Swell		Surf. sal. (‰)
						Dir. (°T.)	Force (kt.)	Dry bulb (°F.)	Wet bulb (°F.)			Type	Cover			Dir. (°T.)	Amt.	
241	0723	8/23	41°35'	175°01'	61.7	03	04	63.7	59.5	1020	00	x	x	8	01	xx	x	33.95
242	1750	8/23	41°35'	175°10'	61.2	09	16	61.2	57.9	1020	02	6	7	7	2	06	2	
243	1900	8/23	41°28'	175°10'	62.9	08	22	62.5	58.0	1020	02	6	7	7	2	06	2	34.07
244	2130	8/23	41°12'	175°10'	64.1	11	17	63.5	60.0	1020	02	6	8	7	2	xx	2	34.15
245	0000	8/24	40°57'	175°10'	63.1	10	18	63.8	60.4	1019	02	6	8	8	3	13	1	34.08
246	0230	8/24	40°39'	175°11'	63.7	11	18	63.7	60.5	1018	02	6	8	8	3	12	1	33.97
247	0355	8/24	40°30'	175°11'	64.1	11	19	62.3	60.5	1018	53	6	9	6	3	13	1	
248	0520	8/24	40°29'	175°11'	64.0	11	20	62.7	61.0	1018	53	6	8	6	3	13	1	
249	0830	8/24	40°12'	175°07'	63.9	14	20	64.0	62.5	1017	40	x	8	6	3	13	1	33.93
250	1040	8/24	39°54'	175°08'	64.6	14	21	65.0	63.6	1016	00	x	x	x	3	xx	x	
251	1250	8/24	39°35'	175°09'	64.0	20	18	65.0	64.5	1014	00	x	x	x	3	xx	x	
252	1510	8/24	39°16'	175°10'	67.8	20	19	70.3	69.3	1013	00	x	x	x	3	xx	x	
253	1645	8/24	39°13'	175°10'	67.9	20	19	71.3	70.2	1013	00	x	x	x	3	xx	x	
254	1900	8/24	38°52'	175°06'	70.7	20	22	72.9	71.8	1014	02	6	8	8	3	20	1	34.47
255	2120	8/24	38°33'	175°03'	69.3	22	23	74.0	72.3	1014	01	4,1	6	9	3	24	1	34.31
256	2320	8/24	38°10'	175°00'	70.3	23	25	73.8	72.5	1015	02	4,1	6	8	3	23	1	
257	0030	8/25	38°00'	174°58'	71.8	21	22	74.6	72.4	1015	02	4,1	6	8	3	21	1	
258	0130	8/25	37°58'	174°58'	71.8	21	22	74.6	72.4	1015	02	4,1	6	8	3	21	1	
259	0445	8/25	38°14'	174°11'	69.9	22	22	73.7	72.1	1014	02	4,1	6	9	3	25	1	34.37
260	0835	8/25	38°32'	173°31'	69.1	28	08	71.3	70.4	1015	02	x	x	x	x	xx	x	34.48
261	1130	8/25	38°48'	172°58'	69.4	23	15	73.5	70.5	1014	02	5,6	6	9	2	xx	x	34.34
262	1445	8/25	39°04'	172°23'	68.0	24	16	72.0	69.1	1014	02	6	7	9	2	24	1	34.36
263	1810	8/25	39°16'	171°44'	67.2	22	13	70.2	68.0	1015	03	6	8	9	2	23	1	
264	2125	8/25	39°25'	171°00'	68.0	22	17	72.0	68.2	1015	02	6	8	9	2	23	1	
265	2225	8/25	39°25'	170°58'	67.7	22	17	70.2	67.4	1015	02	6	8	9	2	23	1	
266	0000	8/26	39°37'	170°55'	67.5	25	18	69.1	67.8	1015	01	5,1	6	9	3	23	1	34.31
267	0230	8/26	39°57'	170°50'	64.5	24	13	68.1	65.0	1015	02	5,1	5	9	2	23	1	34.18
268	0650	8/26	39°50'	170°52'	65.7	23	10	68.2	65.5	1016	00	x	x	8	2	xx	x	34.33
269	1740	8/26	39°53'	170°46'	65.3	24	18	68.9	67.1	1015	47	0	9	4	3	24	1	34.32
270	1925	8/26	40°03'	170°42'	64.4	24	20	68.8	67.0	1015	47	0	9	5	2	24	1	34.12
271	2115	8/26	40°15'	170°38'	64.6	24	18	67.2	66.0	1015	47	0	9	5	2	24	1	34.21
272	2310	8/26	40°28'	170°33'	61.5	20	19	65.0	64.7	1015	47	x	9	1	2	xx	1	
273	0020	8/27	40°28'	170°32'	61.8	20	19	67.0	65.3	1014	47	x	9	1	2	19	2	
274	0150	8/27	40°38'	170°28'	61.9	21	16	67.1	65.0	1013	43	x	9	4	2	18	1	33.86
275	0350	8/27	40°20'	170°16'	63.0	22	18	68.1	66.0	1013	43	x	9	6	2	19	1	33.92
276	0645	8/27	40°15'	170°16'	63.2	22	19	67.5	66.5	1014	65	x	8	x	3	xx	x	33.89
277	1840	8/27	40°16'	170°19'	63.0	18	12	63.6	62.5	1018	01	5	7	7	2	23	1	
278	0110	8/28	40°13'	170°20'	63.1	12	16	63.0	61.2	1018	21	0	9	6	3	20	1	33.93
279	0500	8/28	40°32'	170°18'	63.5	21	18	67.5	66.0	1015	40	x	9	5	3	20	1	33.99
280	0730	8/28	40°58'	170°16'	61.3	19	27	67.0	65.0	1015	00	x	x	6	3	xx	x	33.79

Table 14.--Summary of observations at bathythermograph casts (U. S. Navy Hydrographic Office 1956), Hugh M. Smith cruise 46 (cont'd)

Ser. No.	Time (GCT)	Date, 1958	Latitude N.	Longitude W.	Bkt. temp. (°F.)	Wind		Air temp.		Barometer (mb.)	Weather	Clouds		Visibility	Sea	Swell		Surf. sal. (‰)
						Dir. (°T.)	Force (kt.)	Dry bulb (°F.)	Wet bulb (°F.)			Type	Cover			Dir. (°T.)	Amt.	
281	0915	8/28	41°17'	170°15'	61.3	19	26	67.0	64.6	1014	02	x	8	6	3	xx	x	
282	1100	8/28	41°34'	170°14'	61.2	18	28	66.6	65.0	1011	02	x	x	x	4	18	1	33.76
283	1925	8/28	41°26'	170°38'	60.2	xx	12	61.4	58.6	1016	02	0	9	8	4	xx	3	
284	2045	8/28	41°26'	170°39'	60.3	xx	10	61.4	58.6	1010	02	0	9	8	4	xx	3	
285	2315	8/28	41°44'	170°31'	61.4	28	04	60.0	58.4	1018	50	0	8	8	3	26	3	33.99
286	0145	8/29	41°58'	170°23'	61.2	25	09	61.0	58.9	1019	02	0	8	8	3	26	4	34.03
287	0500	8/29	42°21'	170°12'	60.8	27	04	60.0	58.2	1019	01	4,6	6	8	2	28	2	
288	0630	8/29	42°21'	170°12'	61.1	00	00	64.0	59.8	1019	01	4,6	6	8	2	28	2	
289	1750	8/29	42°23'	170°08'	60.4	03	17	57.9	56.1	1019	20	0	8	7	2	03	2	33.89
290	0100	8/30	42°13'	170°11'	61.1	--	14	60.0	57.5	1021	01	4,6	8	8	2		2	34.05
291	0810	8/30	42°50'	169°57'	58.7	30	15	56.0	53.2	1024	02	x	8	8	2	xx	2	33.68
292	1735	8/30	42°46'	170°03'	58.7	32	13	57.5	53.0	1024	02	6,4,8	7	9	2	33	2	33.72
293	1910	8/30	42°56'	169°56'	59.1	07	16	57.5	53.0	1024	01	6,3	5	9	2	08	2	33.78
294	2100	8/30	43°06'	169°48'	59.2	10	18	58.2	53.3	1025	02	8,6,3	4	9	2	07	2	33.74
295	2300	8/30	43°17'	169°40'	57.7	08	18	57.7	54.7	1025	02	6,8	6	8	2	08	2	
296	0005	8/31	43°18'	169°39'	57.5	08	18	58.2	56.9	1025	03	6,8	8	8	2	08	1	
297	0220	8/31	43°35'	169°34'	57.4	11	21	58.9	57.8	1024	02	6,8	8	8	2	08	1	33.46
298	0430	8/31	42°52'	169°31'	57.0	11	19	57.0	55.9	1023	02	6,8	8	8	3	09	1	33.17
299	0700	8/31	44°05'	169°21'	55.3	10	18	56.5	55.1	1023	50	x	9	7	3	xx	1	
300	0835	8/31	44°06'	169°20'	55.0	11	22	55.5	53.9	1022	61	x	9	7	3	11	1	
301	1100	8/31	44°22'	169°14'	54.8	08	20	54.0	54.0	1021	62	x	9	x	3	xx	x	32.87
302	1330	8/31	44°37'	169°08'	54.5	09	34	55.1	54.7	1016	65	x	x	x	3	xx	x	
303	2135	8/31	44°45'	168°40'	54.2	16	10	58.0	57.5	1013	47	x	9	2	3	11	3	32.82
304	0000	9/1	45°05'	168°42'	55.1	18	12	61.0	59.2	1012	53	0	9	3	2	11	1	32.83
305	0200	9/1	45°20'	168°44'	54.9	17	12	60.1	58.3	1011	53	0	9	4	2	11	1	32.90
306	0500	9/1	45°46'	168°46'	55.0	16	13	58.3	58.0	1008	55	0	9	4	2	16	2	
307	0610	9/1	45°46'	168°46'	55.0	16	13	58.3	58.0	1008	55	0	9	4	2	16	2	
308	1900	9/1	45°52'	166°16'	54.6	17	11	57.1	56.3	1009	20	0	9	4	2	16	2	32.85
309	2200	9/1	46°12'	165°41'	54.1	24	15	60.0	56.9	1010	02	0	9	4	2	20	2	32.78
310	0100	9/2	46°23'	165°12'	53.8	19	10	57.6	55.8	1009	45	x	9	3	3	20	3	32.90
311	0345	9/2	46°34'	164°44'	53.3	24	14	55.0	55.0	1009	45	x	9	2	3	20	3	
312	0445	9/2	46°34'	164°44'	53.3	25	14	55.0	55.0	1009	45	x	9	2	3	20	3	
313	1800	9/2	46°34'	164°28'	53.0	33	12	53.0	52.8	1016	40	0	8	6	2	27	2	
314	0030	9/3	46°28'	164°29'	53.3	32	16	55.1	54.5	1016	40	0	9	4	3	27	2	32.84
315	0345	9/3	46°18'	164°30'	53.7	16	08	54.8	53.9	1018	10	0	9	6	2	14	2	32.82
316	0515	9/3	46°05'	164°30'	54.0	11	18	55.0	53.8	1017	45	0	9	4	3	12	2	32.72
317	0645	9/3	45°52'	164°37'	53.8	15	15	55.0	54.0	1016	53	x	9	x	3	xx	x	32.75
318	0815	9/3	45°39'	164°46'	53.9	13	18	54.9	54.8	1013	65	x	x	x	3	xx	x	
319	0920	9/3	45°38'	164°47'	54.0	23	18	55.8	55.0	1012	65	x	9	x	3	16	x	
320	1230	9/3	45°22'	164°55'	54.7	20	24	59.0	58.8	1009	63	x	x	5	03	xx	x	32.51

Table 14.--Summary of observations at bathythermograph casts (U. S. Navy Hydrographic Office 1956), Hugh M. Smith cruise 46 (cont'd)

Ser. No.	Time (GCT)	Date, 1958	Latitude N.	Longitude W.	Bkt. temp. (°F.)	Wind		Air temp.		Barometer (mb.)	Weather	Clouds		Visibility	Sea	Swell		Surf. sal. (‰)
						Dir. (°T.)	Force (kt.)	Dry bulb (°F.)	Wet bulb (°F.)			Type	Cover			Dir. (°T.)	Amt.	
321	1530	9/3	45°07'	165°05'	55.3	18	25	59.3	59.0	1008	00	x	9	6	3	xx	x	32.72
322	1915	9/3	44°58'	165°06'	56.1	21	18	59.9	57.6	1009	01	6,4	8	6	3	20	2	32.88
323	2125	9/3	44°44'	165°04'	56.3	21	22	61.5	58.5	1008	01	4,6	6	7	4	21	2	
324	2240	9/3	44°43'	165°04'	56.2	20	26	60.3	57.6	1008	02	4,6	6	7	4	20	2	
325	0215	9/4	44°28'	165°04'	56.4	22	32	58.2	56.3	0808	02	0	8	6	5	20	4	33.09
326	2100	9/4			60.1													33.44
327	0000	9/5			60.9													33.55
3289	0300	9/5			62.7													33.84
3286	0345	9/5			62.3													33.83
329	0600	9/5			64.4													33.86
330	0900	9/5			65.9													33.76
331	1200	9/5			66.5													34.02

Table 15.--Summary of observations at bathythermograph casts (U. S. Navy Hydrographic Office 1956), M/V Paragon

Ser. No.	Time (GCT)	Date, 1956	Latitude N.	Longitude W.	Bkt. temp. (°F.)	Wind		Air temp.		Barometer (mb.)	Weather	Clouds		Visibility	Sea	Swell		Surf. sal. (‰)
						Dir. (°T.)	Force (kt.)	Dry bulb (°F.)	Wet bulb (°F.)			Type	Cover			Dir. (°T.)	Amt.	
1	0720	7/28	41°40'	157°11'	62.7	22	17	-	-	1018	02	4	7	8	3	08	1	
2	2400	7/29	42°20'	156°49'	60.3	27	10	-	-	1027	02	8	5	9	2	27	1	
3	2240	7/30	41°49'	157°09'	61.8	32	05	-	-	1029	02	6	7	9	2	32	1	
4	2150	7/31	41°43'	157°03'	62.0	32	12	-	-	1028	02	6	7	9	2	32	1	
5	2100	8/1	41°38'	157°20'	62.0	32	10	-	-	1030	02	6	7	9	2	32	1	
6	2100	8/2	42°31'	157°08'	57.7	27	10	-	-	1030	02	6	7	9	2	30	1	
7	2005	8/3	42°56'	158°13'	57.4	26	22	-	-	1023	02	6	8	7	4	26	3	
8	2115	8/5	41°16'	161°24'	60.8	27	10	-	-	1026	12	-	9	1	4	28	3	
9	2130	8/6	41°36'	162°40'	60.2	27	05	-	-	1033	02	6	8	6	2	27	1	
10	2215	8/7	41°27'	163°37'	61.4	32	05	-	-	1033	45	-	9	0	2	32	1	
11	2046	8/8	42°12'	163°30'	58.9	33	08	-	-	1033	02	6	8	8	2	33	1	
12	0230	8/9	42°19'	163°10'	58.9	35	12	-	-	1032	02	6	8	8	2	35	1	
13	2245	8/9	42°11'	162°10'	59.2	29	16	-	-	1030	41	2	6	7	3	28	1	
14	2100	8/10	42°15'	160°51'	59.4	31	18	-	-	1027	43	-	9	7	4	31	3	
15	2220	8/11	41°57'	159°12'	58.5	25	25	-	-	1025	43	-	9	7	4	25	3	
16	2140	8/13	42°06'	159°22'	57.7	32	23	-	-	1020	01	6	8	8	4	32	4	
17	2400	8/14	41°50'	159°23'	58.7	32	05	-	-	1021	01	4	5	9	2	32	1	
18	2150	8/15	42°02'	158°57'	59.7	24	05	-	-	1023	02	6	7	9	2	24	1	
19	2230	8/16	42°24'	158°38'	58.7	18	33	-	-	1013	21	6	8	5	4	18	3	
20	2145	8/17	42°24'	158°35'	58.8	05	10	-	-	1013	20	-	9	0	2	27	1	
21	2000	8/18	42°34'	158°27'	58.3	20	25	-	-	1015	28	-	9	0	6	20	7	
22	2300	8/21	42°26'	158°16'	58.7	16	18	-	-	1013	60	6	7	8	4	16	4	
23	2200	8/23	42°30'	157°56'	58.7	27	05	-	-	1023	02	6,8	3	9	2	18	1	
24	2300	8/24	42°02'	159°05'	57.5	14	05	-	-	1023	61	-	9	5	2	14	1	
25	2200	8/25	42°06'	158°45'	59.6	14	07	-	-	1018	47	-	9	0	2	9	1	
26	2120	8/26	41°38'	158°25'	59.9	27	12	-	-	1019	28	-	9	1	2	18	1	
27	2310	8/27	41°43'	157°22'	63.0	19	18	-	-	1024	45	-	9	2	3	19	1	
28	0100	8/29	41°45'	157°09'	64.0	23	15	-	-	1024	02	6	6	9	2	23	1	
29	2133	8/29	41°48'	156°52'	63.5	24	15	-	-	1025	28	-	9	0	3	21	1	
30	2130	8/30	41°46'	157°09'	62.7	23	23	-	-	1021	63	-	9	0	5	23	3	

Table 16.--Log of ship's weather observations, Hugh M. Smith cruise 46
(U. S. W. B. Form 1210F in International Ship Weather Code)1/

Date, 1958	Latitude N.	Longitude W.	Time (GCT)	Visibility	Wind		Weather		Pressure			Temperature (°F.)			Clouds						Waves		
					Direction	Speed (kt.)	Present	Past	Bar. corr. (mb.)	Characteristic	Amt. change	Dry bulb	Wet bulb	Sea water	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
7/22	21.2°	158.3°	0600	99	12	18	02	0	1015.9	2	1.7	77.2	71.0	74.0	2	1	2	5	0	0	09	2	1
7/22	22.0°	158.5°	1200	99	08	12	00	X	1016.6	8	0.9	77.2	70.9	78.6	9	9	X	X	X	X	XX	X	X
7/22	22.0°	158.5°	1800	98	07	15	50	X	1018.0	2	0.9	76.7	71.8	77.9	9	9	X	0	X	X	06	1	3
7/23	23.0°	158.6°	0000	99	07	15	02	X	1018.0	4	0.0	78.8	72.1	78.4	3	3	2	5	0	0	07	2	3
7/23	23.9°	158.6°	0600	99	06	18	02	1	1018.0	2	1.0	76.1	70.6	77.5	5	5	2	4	6	0	05	3	4
7/23	24.7°	158.6°	1200	99	07	15	00	X	1018.6	1	0.7	75.2	70.6	73.3	X	X	X	X	X	X	XX	X	X
7/23	25.6°	158.6°	1800	99	05	10	14	2	1020.3	2	0.7	76.8	71.9	75.6	6	6	7	X	0	0	06	3	3
7/24	26.4°	158.7°	0000	99	07	14	02	2	1020.3	8	1.0	78.3	72.0	76.0	4	4	7	5	6	0	06	3	3
7/24	26.9°	158.6°	0600	99	07	14	02	0	1020.0	0	0.7	75.3	69.8	74.8	3	3	7	2	0	0	07	3	3
7/24	27.8°	158.6°	1200	99	06	12	02	X	1020.0	0	0.0	74.8	69.7	75.5	X	X	X	X	X	X	07	3	3
7/24	28.7°	158.7°	1800	99	10	10	02	0	1020.7	2	1.9	75.9	70.0	74.3	4	4	2	5	0	0	12	2	2
7/25	29.7°	158.9°	0000	99	13	02	01	1	1019.6	7	0.3	75.3	69.6	76.3	4	4	2	4	6	0	12	2	2
7/25	30.6°	159.0°	0600	99	12	10	01	0	1020.0	2	1.0	75.8	67.6	75.5	2	2	4	X	X	X	13	2	2
7/25	31.5°	159.0°	1200	99	16	10	00	X	1018.6	7	0.7	74.3	69.1	74.7	X	X	X	X	X	X	XX	X	X
7/25	32.3°	159.9°	1900	99	19	13	02	1	1018.0	7	0.7	75.0	69.1	74.5	4	4	2	X	6	0	15	2	2
7/26	33.3°	158.9°	0000	99	21	15	02	1	1016.3	7	1.2	76.5	70.1	74.9	2	2	2	5	0	0	16	X	2
7/26	33.9°	158.9°	0600	99	19	14	03	2	1015.9	7	0.5	75.0	71.0	74.8	7	4	8	5	5	X	XX	X	X
7/26	34.8°	159.0°	1300	99	18	18	02	2	1014.9	7	1.0	74.0	70.9	73.3	X	X	X	X	X	X	21	X	2
7/26	35.7°	159.0°	1800	99	25	09	25	6	1014.9	2	0.7	73.2	70.1	73.7	7	7	7	5	X	X	23	4	3
7/27	37.4°	159.2°	0700	99	21	08	03	1	1015.2	2	0.7	72.5	69.9	71.8	3	3	0	X	1	X	21	2	2
7/27	38.2°	159.3°	1200	99	29	14	02	1	1017.6	4	0.0	70.0	66.4	70.4	X	X	X	X	X	X	XX	X	X
7/27	38.4°	159.2°	1900	99	25	14	02	2	1019.6	2	1.0	69.5	65.9	69.8	8	0	0	X	3	X	29	2	2
7/28	39.2°	159.2°	0000	99	28	16	50	5	1021.0	6	0.7	69.6	67.3	67.7	8	8	7	5	6	X	29	2	2
7/28	39.7°	159.3°	0700	99	31	14	02	2	1022.0	2	0.7	67.3	63.5	67.1	8	8	4	X	X	X	29	2	2
7/28	39.7°	159.3°	1300	99	24	16	00	2	1023.4	0	0.3	68.5	66.0	66.3	X	X	X	X	X	X	XX	X	X
7/28	39.9°	159.3°	1800	98	26	11	20	5	1025.1	2	1.7	66.3	64.7	65.2	7	7	6	X	X	X	30	2	2
7/29	40.6°	159.3°	0000	98	25	12	03	2	1025.7	2	0.5	67.0	64.5	63.9	8	8	6	X	X	X	30	2	2
7/29	40.8°	159.7°	0600	96	28	17	50	5	1025.4	1	1.0	66.0	64.3	63.7	9	9	X	0	X	X	30	2	2
7/29	40.9°	159.6°	1300	96	23	16	45	4	1026.1	4	0.0	64.8	63.8	63.3	X	X	X	X	X	X	XX	X	X
7/29	40.8°	159.6°	1800	97	01	08	50	6	1026.8	2	0.3	62.7	60.3	63.2	8	8	7	2	X	X	28	4	2
7/30	41.3°	159.7°	0000	99	31	16	01	2	1029.1	4	0.0	59.5	55.0	61.8	3	3	0	5	X	X	30	4	3
7/30	41.3°	159.9°	0000	99	35	10	03	2	1030.5	2	0.3	61.0	56.0	61.3	7	7	5	5	X	X	XX	X	2
7/30	41.5°	159.9°	1300	99	29	08	02	2	1030.5	7	0.7	60.2	54.8	61.2	8	X	X	X	X	X	XX	X	X
7/30	41.5°	159.9°	1800	99	36	11	02	2	1030.8	1	0.7	59.0	54.0	60.4	8	8	7	4	0	0	34	3	2
7/31	42.0°	160.0°	0000	98	35	10	02	2	1030.8	4	0.0	59.4	53.4	59.8	7	7	4	4	0	0	33	3	2
7/31	41.9°	159.5°	0600	99	32	07	02	2	1030.1	4	0.0	58.0	53.0	58.9	8	8	7	4	0	0	33	3	2
7/31	42.0°	159.6°	1300	99	28	05	02	2	1030.1	7	0.7	58.4	56.2	58.5	X	X	X	X	X	X	XX	X	X
7/31	41.9°	159.5°	1900	99	30	06	02	2	1030.5	2	0.1	59.5	54.0	59.8	8	8	7	X	X	X	28	3	2
8/1	41.2°	158.6°	0000	99	32	06	02	2	1030.1	4	0.0	59.0	56.0	62.5	8	8	7	X	X	X	30	3	2
8/1	41.2°	158.4°	0600	99	10	06	02	2	1029.5	3	0.9	57.3	53.9	61.4	8	8	7	4	X	X	XX	X	X

1/ All columns in USWB 1210F are not included here. Those deleted are:

Column 2 Day of week
" 3 Octant
" 13 Barometer as read
" 14 Barometer as corrected
" 17 Air temperature, °F.
Column 23 Course of ship
" 24 Speed of ship
" 31 Diff. sea-air, °F.
" 32 Dew point, °F.

Table 16.--Log of ship's weather observations, Hugh M. Smith cruise 46
(U. S. W. B. Form 1210F in International Ship Weather Code) (cont'd)

Date, 1958	Latitude N.	Longitude W.	Time GCT)	Visibility	Wind		Weather		Pressure			Temperature (°F.)			Clouds						Waves		
					Direction	Speed (kt.)	Present	Past	Bar. corr. (mb.)	Characteristic	Amt. change	Dry bulb	Wet bulb	Sea water	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
8/1	41.2°	158.4°	1300	99	34	08	02	2	1029.5	7	0.7	57.4	54.2	61.3	X	X	X	X	X	X	XX	X	X
8/1	41.2°	158.4°	1800	99	04	09	20	5	1030.8	7	0.9	58.4	52.1	60.9	8	8	5	4	X	X	34	4	2
8/2	41.8°	158.4°	0000	99	03	06	02	2	1030.8	4	0.0	59.6	54.0	61.9	8	8	6	4	X	X	33	1	2
8/2	42.3°	158.4°	0600	99	35	06	02	2	1031.8	3	0.3	54.9	53.1	59.9	8	8	6	4	X	X	34	3	2
8/2	42.3°	158.4°	1300	99	01	06	02	2	1032.2	7	0.3	54.7	50.7	59.3	X	X	X	X	X	X	XX	X	X
8/2	43.1°	158.3°	1800	99	35	05	02	2	1031.5	4	0.0	54.1	50.1	59.2	8	8	6	X	X	X	34	2	2
8/3	42.4°	158.4°	0000	99	29	17	02	2	1029.8	7	1.4	55.0	53.0	57.2	8	8	6	X	X	X	34	2	3
8/3	43.1°	158.5°	0600	98	28	13	02	2	1028.1	6	1.7	55.3	53.0	56.7	8	8	6	X	X	X	32	2	3
8/3	43.2°	158.6°	1300	98	30	22	02	2	1026.8	7	1.0	54.2	52.0	56.3	X	X	X	X	X	X	XX	X	X
8/3	43.2°	158.8°	1800	98	27	22	20	5	1025.4	7	0.7	55.2	53.8	56.4	8	8	7	4	X	X	31	3	3
8/4	44.3°	158.9°	0400	97	28	22	20	5	1020.7	7	4.7	55.5	54.5	55.3	9	9	X	0	X	X	31	3	5
8/4	44.3°	159.0°	0600	97	25	22	20	5	1020.3	7	0.9	55.6	54.7	55.0	8	8	7	4	X	X	27	3	6
8/4	44.6°	159.0°	1200	96	24	24	60	6	1019.0	7	0.7	56.9	55.0	54.7	8	8	7	3	X	X	XX	X	X
8/4	43.8°	159.9°	1800	96	36	22	60	6	1018.3	2	0.7	56.2	55.0	54.3	8	8	7	3	X	X	27	2	6
8/5	44.2°	159.8°	0000	97	27	18	02	2	1018.6	4	0.0	56.1	55.0	54.3	8	8	6	3	X	X	27	2	5
8/5	45.0°	159.6°	0700	XX	28	17	60	5	1017.6	2	0.7	53.3	51.5	53.7	8	8	7	3	X	X	XX	X	X
8/5	45.5°	159.4°	1200	XX	30	22	00	X	1019.0	4	0.0	53.7	51.3	52.4	X	X	X	X	X	X	XX	X	X
8/5	46.2°	159.6°	1800	98	28	18	02	2	1022.0	2	2.0	51.9	50.0	51.4	8	8	6	3	X	X	27	4	5
8/6	46.9°	159.7°	0000	98	28	12	02	2	1023.0	1	0.5	51.7	50.3	51.2	8	8	6	3	X	X	30	3	3
8/6	47.6°	159.7°	0600	97	27	17	16	2	1024.7	2	0.5	51.9	50.0	50.8	8	8	6	3	X	X	30	3	3
8/6	48.0°	158.8°	1200	97	28	12	00	X	1025.7	1	0.7	50.8	49.9	49.4	X	X	X	X	X	X	XX	X	X
8/6	49.0°	159.8°	1800	97	28	12	10	4	1025.4	4	0.0	49.9	49.1	48.7	9	9	X	0	X	X	28	3	2
8/7	49.9°	159.7°	0000	95	30	08	10	4	1025.1	7	0.2	53.1	51.2	49.3	9	9	X	0	X	X	30	5	1
8/7	50.8°	159.7°	0600	99	33	18	02	2	1026.8	2	0.7	49.8	47.1	48.8	8	8	6	4	X	X	33	2	2
8/7	51.7°	159.8°	1300	99	33	19	02	2	1028.1	4	0.3	50.0	48.0	48.9	8	8	X	X	X	X	30	2	2
8/7	52.5°	159.8°	1900	99	32	20	02	2	1027.8	4	0.0	50.6	49.7	49.3	8	8	6	4	0	0	31	2	3
8/8	53.0°	160.0°	0100	99	29	20	01	2	1027.1	1	0.3	50.7	49.7	50.1	7	7	6	4	0	0	30	2	4
8/8	53.9°	159.9°	0600	99	27	20	01	2	1025.1	7	2.0	51.2	50.0	52.5	7	7	6	4	0	0	30	2	4
8/8	53.9°	160.1°	1200	99	21	21	01	2	1022.0	7	2.4	52.5	51.0	52.0	X	X	X	X	X	X	XX	X	X
8/8	53.0°	161.9°	1900	92	24	18	45	4	1018.0	0	0.0	53.8	53.4	50.8	X	X	X	X	X	X	31	2	4
8/8	52.4°	161.4°	2300	93	25	20	10	4	1018.6	2	1.4	54.6	53.0	50.0	9	9	X	0	X	X	26	1	3
8/8	51.6°	162.0°	0600	93	26	20	45	4	1018.6	4	0.0	53.0	51.9	49.7	9	9	X	0	X	X	26	3	4
8/9	50.9°	162.6°	1200	90	26	18	45	4	1019.6	1	0.5	52.5	51.4	49.1	9	9	X	0	X	X	XX	X	X
8/9	50.5°	163.8°	1900	93	25	20	45	4	1022.0	2	1.4	53.1	52.5	49.0	9	9	X	0	X	X	27	3	3
8/10	50.3°	165.2°	0000	96	28	20	40	4	1023.7	2	1.7	54.4	51.8	49.4	9	9	X	0	X	X	28	3	3
8/10	50.1°	166.6°	0600	92	27	16	47	4	1025.4	2	0.7	52.7	52.0	49.8	9	9	X	0	X	X	26	3	3
8/10	50.1°	168.1°	1200	92	24	16	45	4	1025.1	6	0.9	52.1	51.3	49.7	9	9	X	0	X	X	XX	X	X
8/10	50.0°	169.8°	1900	92	24	20	45	4	1021.3	7	2.0	53.2	52.8	50.0	9	X	X	X	X	X	23	3	3
8/11	50.0°	170.2°	0000	92	22	27	45	4	1019.3	7	2.0	55.2	53.9	50.0	9	9	X	0	X	X	26	5	5
8/11	49.9°	172.6°	1300	99	25	22	01	1	1015.6	4	0.0	52.7	50.8	50.0	4	4	X	X	X	X	26	4	4

Table 16.--Log of ship's weather observations, Hugh M. Smith cruise 46
(U. S. W. B. Form 1210F in International Ship Weather Code) (cont'd)

Date, 1958	Latitude N.	Longitude W.	Time (GCT)	Visibility	Wind		Weather		Pressure			Temperature (°F.)			Clouds						Waves		
					Direction	Speed (kt.)	Present	Past	Bar. corr. (mb.)	Characteristic	Amt. change	Dry bulb	Wet bulb	Sea water	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
8/11	50.0°	174.0°	1900	99	27	24	01	1	1013.2	7	1.4	54.3	51.0	50.0	1	1	4	4	X	X	26	4	4
8/12	49.5°	174.0°	0000	95	26	21	47	4	1015.9	2	1.2	53.5	52.0	50.1	9	9	X	0	X	X	26	4	4
8/12	48.8°	174.7°	0600	97	29	17	40	4	1020.0	2	2.0	52.9	51.2	50.7	9	9	X	0	X	X	30	3	4
8/12	48.0°	175.0°	1200	92	29	18	47	4	1023.4	2	1.7	52.5	51.8	51.7	9	9	X	0	X	X	XX	X	X
8/12	47.3°	174.9°	1800	99	28	10	01	1	1023.7	2	0.5	54.6	52.1	52.7	2	2	5	X	X	X	30	4	2
8/13	46.8°	175.0°	0000	98	30	09	03	1	1025.7	1	1.5	57.0	55.5	53.5	7	7	5	4	0	0	30	4	2
8/13	46.3°	175.0°	0600	99	28	10	28	1	1026.1	2	0.5	55.0	53.9	54.7	4	4	5	3	X	1	28	3	2
8/13	46.2°	175.0°	1200	99	28	10	02	2	1026.1	4	0.0	56.2	55.9	54.7	X	X	X	X	X	X	XX	X	X
8/13	46.2°	174.9°	1800	97	31	08	40	4	1027.8	2	1.2	52.9	51.9	54.4	9	9	X	0	X	X	25	4	1
8/14	45.5°	174.9°	0000	99	28	02	02	2	1028.4	4	0.0	58.2	54.2	55.8	9	9	X	0	X	X	30	3	1
8/14	45.2°	174.9°	0600	96	32	06	40	2	1027.4	7	0.5	57.0	55.5	56.0	8	9	X	0	X	X	26	4	2
8/14	45.2°	175.0°	1300	99	27	10	40	4	1026.8	7	1.0	57.8	56.2	56.0	X	X	X	X	X	X	XX	X	X
8/14	45.2°	174.8°	1800	98	32	06	40	4	1026.4	4	0.0	57.0	56.1	55.9	9	8	6	X	X	X	26	2	2
8/15	45.1°	174.7°	0000	95	30	13	47	4	1025.4	8	0.3	56.5	56.0	56.1	9	9	X	0	X	X	29	3	1
8/15	44.6°	174.8°	0600	95	27	10	47	4	1023.7	6	0.3	59.8	58.2	57.8	9	9	X	0	X	X	28	3	1
8/15	44.6°	174.9°	1300	95	28	18	62	4	1021.0	7	3.1	59.4	58.7	57.4	X	X	X	X	X	X	XX	X	X
8/15	44.5°	174.6°	1800	95	25	24	51	4	1015.6	7	2.7	58.5	58.0	57.1	9	9	X	0	X	X	24	3	3
8/16	44.2°	174.7°	0000	98	29	22	02	2	1016.3	4	0.0	59.5	58.2	58.6	9	9	X	0	X	X	27	3	4
8/16	43.5°	174.8°	0600	96	32	17	40	2	1019.0	2	1.7	58.9	57.2	59.0	8	8	6	X	X	X	25	3	4
8/16	43.5°	174.9°	1300	98	30	20	40	2	1017.6	7	1.4	61.0	60.3	59.2	X	X	X	X	X	X	XX	X	X
8/16	43.5°	174.9°	1800	96	30	19	40	5	1015.9	3	1.0	61.0	60.0	58.9	8	8	X	0	X	X	29	3	3
8/17	43.5°	174.9°	0000	94	27	18	47	4	1015.9	4	0.0	60.0	59.2	58.7	8	8	X	0	X	X	28	2	2
8/17	43.4°	174.7°	0600	95	21	08	47	4	1013.2	7	0.7	62.5	61.0	58.8	9	9	X	0	X	X	21	2	2
8/17	43.1°	174.9°	1300	95	24	15	51	4	1010.2	7	2.0	61.0	60.3	59.0	X	X	X	X	X	X	XX	X	X
8/17	43.3°	174.6°	1800	95	21	09	51	4	1006.1	7	2.0	60.1	60.0	58.8	9	9	X	0	X	X	21	2	2
8/18	42.9°	174.9°	0000	94	31	12	49	4	1005.4	4	0.0	63.7	63.0	61.4	9	9	X	0	X	X	30	2	2
8/18	42.8°	175.1°	0600	97	29	18	40	2	1006.1	4	0.0	60.1	58.9	61.0	8	8	7	X	X	X	29	3	3
8/18	42.5°	175.0°	1300	97	30	20	50	5	1007.5	4	0.0	61.2	58.2	61.0	X	X	X	X	X	X	XX	X	X
8/18	42.5°	175.0°	1900	99	29	08	01	2	1007.1	5	0.0	60.1	56.7	60.8	7	7	6	3	X	X	XX	2	1
8/19	42.5°	175.0°	0000	99	23	14	03	1	1004.1	8	2.4	64.1	60.8	61.7	8	0	0	7	2	X	26	5	2
8/19	42.8°	175.1°	0600	97	24	16	02	6	999.3	7	2.0	62.0	60.8	61.4	8	8	6	X	X	X	23	4	2
8/19	42.8°	175.1°	1300	98	25	16	00	2	1002.4	2	0.7	62.0	59.8	60.7	X	X	X	X	X	X	XX	X	X
8/20	42.2°	175.0°	0000	97	35	23	02	2	1010.8	1	0.9	59.5	55.3	60.6	9	9	X	0	X	X	36	4	5
8/20	41.6°	175.1°	0600	98	36	19	02	2	1014.6	2	2.4	58.8	53.9	61.7	8	8	7	4	X	X	35	3	4
8/20	41.5°	175.1°	1300	98	35	08	02	2	1015.9	2	0.3	58.8	54.0	61.3	X	X	X	X	X	X	XX	X	X
8/20	41.5°	175.1°	1800	98	26	02	02	2	1015.9	6	0.2	60.0	54.0	63.3	8	8	6	4	X	X	35	3	3
8/21	41.2°	175.1°	0600	95	18	28	21	2	1001.0	7	3.9	66.0	65.0	65.3	9	9	X	0	X	X	18	3	5
8/21	41.4°	175.1°	1200	96	25	32	00	2	997.0	7	2.7	66.0	63.6	65.1	X	X	X	X	X	X	XX	X	X
8/21	41.6°	175.0°	1800	98	35	26	02	2	1008.1	2	5.8	59.2	55.0	63.2	7	7	2	4	X	X	34	3	5
8/22	41.3°	175.0°	0100	98	35	19	02	2	1014.9	2	1.2	60.5	55.3	64.3	7	7	2	5	X	X	34	3	4

Table 16.--Log of ship's weather observations, Hugh M. Smith cruise 46
(U. S. W. B. Form 1210F in International Ship Weather Code) (cont'd)

Date, 1968	Latitude N.	Longitude W.	Time (GCT)	Visibility	Wind		Weather		Pressure			Temperature (°F.)			Clouds						Waves		
					Direction	Speed (kt.)	Present	Past	Bar. corr. (mb.)	Characteristic	Amt. change	Dry bulb	Wet bulb	Sea water	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
8/22	41.8°	174.9°	0600	98	35	14	02	2	1017.3	2	1.4	57.5	52.0	60.0	7	7	2	5	0	0	35	3	4
8/22	42.2°	175.0°	1200	98	34	08	00	2	1020.0	2	0.7	59.3	52.0	59.2	X	X	X	X	X	X	XX	X	X
8/22	41.6°	175.0°	1900	99	18	03	02	2	1021.0	2	0.5	59.3	52.1	60.2	9	9	X	0	X	X	05	4	2
8/23	41.5°	175.1°	0000	99	00	00	02	2	1023.0	4	0.0	65.6	58.0	64.8	8	8	5	5	X	X	33	2	4
8/23	41.7°	175.1°	0600	98	07	09	01	2	1014.3	4	0.0	61.0	57.7	60.4	7	7	5	6	X	X	07	4	2
8/23	41.6°	175.0°	1200	99	06	12	00	2	1019.6	7	0.3	63.8	58.4	61.4	X	X	X	X	X	X	XX	X	X
8/23	41.6°	175.0°	1800	98	09	16	02	2	1020.0	4	0.5	61.2	57.9	61.2	7	7	5	5	X	X	06	2	2
8/24	40.9°	175.1°	0000	99	10	18	02	2	1018.6	4	0.4	63.8	60.4	63.1	8	8	5	4	X	X	13	2	2
8/24	40.6°	175.0°	0600	97	11	20	53	5	1017.3	4	0.0	62.7	61.0	64.0	8	8	7	4	X	X	13	3	2
8/24	39.7°	175.0°	1300	XX	20	18	00	X	1013.9	7	1.7	65.0	64.5	64.0	X	X	X	X	X	X	XX	X	X
8/24	38.9°	175.1°	1900	99	20	22	02	2	1013.9	2	0.0	72.9	71.8	70.7	8	8	5	4	X	X	20	2	3
8/25	38.4°	175.0°	0000	99	23	25	01	2	1014.9	2	1.0	73.8	72.5	70.3	7	7	4	6	3	0	23	1	3
8/25	38.3°	173.9°	0600	99	22	18	02	2	1013.9	4	0.0	74.8	71.3	69.5	9	9	X	0	0	0	24	1	2
8/25	38.7°	172.9°	1200	99	23	15	02	2	1014.2	0	0.0	73.5	70.5	69.4	6	6	X	X	X	X	XX	X	X
8/25	39.3°	171.7°	1800	99	22	13	03	2	1014.9	1	0.9	70.2	68.0	67.2	8	8	6	6	X	X	22	3	2
8/26	39.6°	170.9°	0000	99	25	18	01	2	1014.9	4	0.0	69.1	67.8	67.5	6	6	0	X	9	2	27	2	2
8/26	39.8°	170.9°	0600	99	28	12	01	2	1014.9	2	0.7	68.0	65.5	65.7	6	6	0	X	9	3	27	2	2
8/26	39.9°	173.9°	1300	99	28	10	15	2	1015.9	7	0.7	68.3	61.3	65.1	X	X	X	X	X	X	XX	X	X
8/26	40.0°	170.6°	1800	95	24	18	47	2	1014.2	2	0.3	68.9	67.1	65.3	9	9	X	0	X	X	24	2	2
8/27	40.4°	170.5°	0000	93	20	19	47	4	1013.2	7	1.4	67.0	65.3	61.9	9	9	X	0	X	X	19	3	2
8/27	40.3°	170.3°	0600	XX	22	19	65	2	1013.5	2	0.5	67.5	66.5	63.2	8	8	X	X	X	X	XX	X	X
8/27	40.3°	170.3°	1300	98	27	08	00	2	1016.6	2	2.0	65.0	62.3	62.8	X	X	X	X	X	X	XX	X	X
8/27	40.4°	170.3°	1800	98	18	12	01	4	1018.3	8	0.3	63.6	62.5	63.0	7	7	0	5	2	0	23	3	2
8/28	40.4°	170.3°	0000	98	16	14	21	2	1018.3	4	0.0	64.1	62.5	62.9	8	8	6	4	X	X	18	2	2
8/28	40.7°	170.3°	0600	97	23	15	02	2	1014.6	7	1.4	66.0	65.0	62.5	7	7	6	4	X	X	19	2	2
8/28	41.2°	170.3°	1200	XX	18	32	02	2	1010.2	7	1.9	66.6	65.0	61.2	X	X	X	X	X	X	18	2	4
8/28	41.5°	170.6°	1800	98	33	24	02	2	1014.9	2	3.4	63.2	59.5	60.5	8	8	6	4	X	X	23	3	6
8/29	41.8°	170.5°	0000	99	28	04	50	2	1018.3	2	1.0	60.0	58.4	61.4	8	8	6	4	X	X	26	3	4
8/29	42.4°	170.2°	0700	99	00	00	01	2	1019.6	4	0.4	64.0	59.8	61.1	6	6	4	4	X	X	28	3	2
8/29	42.4°	170.1°	1200	99	10	06	00	2	1019.6	4	0.0	61.9	59.6	61.0	X	X	X	X	X	X	XX	X	X
8/29	42.3°	170.2°	1800	98	03	17	20	2	1019.3	2	0.7	57.9	56.1	60.4	8	8	6	5	0	0	03	2	2
8/30	42.7°	170.0°	0600	99	02	18	02	2	1022.4	2	0.7	56.1	53.5	59.6	8	8	1	5	0	0	03	2	2
8/30	42.8°	170.0°	1200	99	10	12	00	2	1023.7	2	0.3	59.7	54.1	58.8	X	X	X	X	X	X	XX	X	X
8/30	42.8°	170.0°	1800	99	32	13	01	2	1023.7	4	0.0	57.5	53.0	58.7	7	7	4	4	6	1	33	2	2
8/31	43.3°	169.6°	0000	98	11	17	03	2	1024.7	2	0.9	58.2	56.9	57.5	8	8	4	5	X	X	08	2	1
8/31	44.1°	169.4°	0700	98	10	18	50	2	1023.0	5	0.5	56.5	55.1	55.3	9	9	X	0	X	X	XX	2	2
8/31	44.5°	169.1°	1100	98	08	20	62	2	1021.0	5	3.1	55.0	54.0	54.8	X	9	X	0	X	X	XX	2	2
8/31	44.4°	168.5°	1800	96	09	18	45	6	1013.9	5	0.7	57.7	57.7	53.9	9	9	X	0	X	X	10	3	4
9/1	45.1°	168.7°	0000	94	18	12	45	4	1011.5	7	0.9	61.0	59.2	55.1	9	9	X	0	X	X	11	2	2
9/1	45.7°	168.8°	0600	96	16	13	55	6	1008.5	7	2.4	58.3	58.0	55.0	9	9	X	0	X	X	16	2	3

Table 16.--Log of ship's weather observations, Hugh M. Smith cruise 46
(U. S. W. B. Form 1210F in International Ship Weather Code) (cont'd)

Date, 1958	Latitude N.	Longitude W.	Time (GCT)	Visibility	Wind		Weather		Pressure			Temperature (°F.)			Clouds						Waves		
					Direction	Speed (kt.)	Present	Past	Bar. corr. (mb.)	Characteristic	Amt. change	Dry bulb	Wet bulb	Sea water	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
9/1	45.9°	167.5°	1200	96	20	13	51	6	1007.8	7	1.0	59.0	57.4	55.2	X	X	X	X	X	X	XX	X	X
9/1	46.0°	166.3°	1800	95	17	11	20	4	1008.8	4	0.0	57.1	56.3	54.6	9	9	X	0	X	X	16	3	5
9/2	46.4°	165.2°	0000	93	19	10	45	4	1009.1	1	0.3	57.0	55.2	53.9	9	9	X	0	X	X	21	3	4
9/2	46.6°	164.7°	0700	93	18	13	45	4	1009.8	2	0.7	56.4	54.8	53.4	9	9	X	0	X	X	XX	X	X
9/2	46.6°	164.6°	1200	93	26	12	00	4	1010.8	2	1.0	55.8	54.0	53.0	X	X	X	X	X	X	XX	X	X
9/2	46.6°	164.5°	1800	97	33	12	40	4	1015.6	2	2.5	53.0	52.8	53.0	8	8	6	4	0	0	27	3	3
9/3	46.5°	164.5°	0000	95	32	16	43	4	1018.3	7	0.2	55.1	54.5	53.3	9	9	X	0	X	X	27	3	3
9/3	46.0°	164.6°	0600	96	11	18	45	4	1016.6	7	1.7	55.0	53.8	54.0	9	9	X	0	X	X	12	2	2
9/3	45.4°	164.9°	1200	96	20	24	63	6	1009.1	7	2.4	59.0	58.9	54.7	X	X	X	X	X	X	XX	X	X
9/3	45.0°	165.1°	1800	96	22	24	43	4	1008.5	5	0.2	59.8	58.2	55.9	9	9	X	0	X	X	20	3	5
9/3	45.0°	165.1°	1900	97	21	18	01	5	1009.1	2	0.3	59.9	57.6	56.1	8	8	4	4	X	X	20	3	4
9/4	44.6°	165.1°	0000	97	21	30	02	2	1008.1	6	0.7	60.0	57.2	56.1	8	8	6	4	0	0	20	2	3
9/4	44.0°	164.7°	0600	97	21	28	02	2	1008.5	1	0.4	59.0	55.9	56.1	8	8	6	4	0	0	20	3	6
9/4	43.3°	164.4°	1200	97	25	22	00	2	1013.9	2	2.4	57.2	55.7	58.3	X	X	X	X	X	X	XX	X	X
9/4	42.9°	163.9°	1800	98	28	21	01	1	1021.0	2	4.1	58.2	56.5	58.8	4	4	2	4	0	0	28	3	4
9/5	41.9°	163.6°	0000	98	29	10	02	2	1023.4	1	0.7	61.4	57.9	60.9	9	9	X	0	X	X	24	3	3
9/5	40.6°	163.4°	0600	98	35	10	02	2	1025.1	2	1.4	61.0	58.8	64.4	8	8	X	X	X	X	XX	2	3
9/5	39.7°	163.4°	1200	99	35	14	02	2	1025.4	4	0.0	61.7	58.5	66.4	8	8	6	4	X	X	34	2	3
9/5	38.6°	163.4°	1800	99	02	17	60	2	1025.4	2	0.7	60.7	60.2	69.0	9	9	X	0	0	0	30	2	3
9/6	37.5°	163.1°	0000	96	02	21	63	5	1025.4	7	0.7	64.7	64.0	69.5	9	9	X	0	X	X	04	2	3
9/6	36.3°	162.8°	0700	96	05	24	63	5	1025.1	2	0.5	70.9	68.5	72.9	9	9	X	0	X	X	XX	X	X
9/6	35.7°	162.6°	1300	97	03	20	00	2	1024.0	4	0.3	72.0	68.5	77.5	X	X	X	X	X	X	XX	X	X
9/6	34.8°	162.2°	1800	99	05	21	01	2	1023.7	2	0.3	74.2	70.1	77.5	6	6	2	4	6	X	04	3	3
9/7	33.9°	161.9°	0000	99	06	13	02	1	1022.0	7	1.7	77.0	71.7	77.8	3	3	2	4	6	0	02	3	3
9/7	33.0°	161.6°	0600	99	05	11	00	1	1021.7	3	0.7	76.9	72.0	77.4	X	X	X	X	X	X	XX	X	X
9/7	32.1°	161.2°	1200	99	06	11	01	1	1020.7	7	0.7	75.3	71.5	77.0	3	3	2	X	X	X	XX	X	X
9/7	31.1°	160.8°	1800	99	06	11	01	0	1020.7	4	0.0	77.0	72.0	77.4	2	2	1	5	0	1	09	2	1
9/8	30.0°	160.6°	0000	99	06	10	02	0	1019.3	7	1.5	77.5	70.9	78.1	2	2	2	5	0	1	08	2	1
9/8	29.1°	160.3°	0600	99	06	14	00	0	1019.0	2	0.7	76.4	72.2	77.2	X	X	X	X	X	X	XX	X	X
9/8	28.3°	160.2°	1200	99	09	08	63	X	1019.0	7	0.7	76.3	72.2	77.3	X	X	X	X	X	X	XX	X	X
9/8	27.0°	159.8°	1800	99	08	14	02	0	1019.0	2	0.3	78.0	73.0	78.0	3	3	2	6	0	1	09	2	2
9/9	26.2°	159.4°	0000	99	08	13	03	0	1018.3	5	0.7	77.4	72.6	78.1	4	4	2	6	0	1	08	2	2
9/9	25.2°	159.1°	0600	99	08	19	03	1	1019.3	2	0.8	77.2	72.7	77.8	5	6	2	4	1	X	08	2	2
9/9	24.2°	158.7°	1200	99	08	13	00	1	1018.6	7	1.7	77.8	73.1	78.3	X	X	X	X	X	X	XX	X	X
9/9	23.0°	158.5°	1800	99	08	19	02	0	1019.0	2	0.3	78.4	73.2	78.6	2	2	2	5	0	0	06	2	1
9/10	22.3°	158.5°	0000	99	05	21	02	0	1017.6	7	1.0	78.8	73.2	79.0	4	4	2	5	X	X	09	2	2

Table 17.--Summary of observations made at submarine photometer stations, Hugh M. Smith cruise 46

Date, 1958	Zone time[1]	Lat. N.	Long. W.	Sea[2]	Cloud cover	Secchi disc (m.)	Photometer depth (m.) at 50, 10, 5, and 1 percent of surface light			
							50%	10%	5%	1%
7/23	1250	26°07'	158°38'	2	3	25	14	35	82	125
7/24	1245	29°29'	158°51'	1	5	35	18	47	72	118
7/25	1255	33°05'	158°50'	1	2	31	17	47	69	105
7/26	1300	36°22'	159°01'	3	1	18	17	32	42	60
7/28	1230	39°00'	159°14'	3	8	13	7	21	33	56
7/28	1000	40°11'	159°18'	3	1	15	4	15	53.5	--
7/28	1230	40°31'	159°18'	2	8	17	5	19	28	52
7/29	2100	41°05'	159°39'	2	8	17	4	13	23.5	46
7/29	1245	41°18'	159°39'	2	2	18	5	27	39	57
7/29	1600	41°30'	159°39'	2	1	18	8	20	29	62
7/30	0830	41°37'	159°58'	2	6	13	1	15	31	51
7/30	1230	42°03'	159°57'	2	6	16	--	13	20	46

1/ Time lowering began; Secchi disc and photometer lowered at same time.

2/ For coded values see U. S. Navy Hydrographic Office (1956).

APPENDIX A

CARBON FIXATION (C_{14}) AND PHYTOPLANKTON DATA FROM HUGH M. SMITH CRUISE 46

By

Mikihiko Oguri
Junior Botanist
University of Hawaii[1/]

Primary productivity measurements were made during the cruise using the radiocarbon tracer technique as modified by Doty and Oguri (1958) from that first described by Steemann Nielsen (1952). This technique consists of introducing a known quantity of radiocarbon to a sample of water containing the natural phytoplankton population. Following a period of incubation at a uniform light intensity, the water is filtered off leaving the phytoplankton on the filter. These filters are stored in a dessicator for later determination of the amount of radiocarbon biologically fixed. From this the total carbon uptake may be calculated.

Pigment concentrations were determined by the method described by Richards and Thompson (1952). Phytoplankton from a measured volume of sea water was collected on a Millipore filter. These filters were stored in a darkened, refrigerated dessicator. Upon return to the laboratory the pigments were extracted with 90-percent acetone and the extinctions of the extract for the wave lengths of peak absorbance for the pigments were spectrophotometrically determined. Conversion of the extinction values obtained to units of pigment was accomplished by use of the formulae listed by Richards and Thompson (1952).

LITERATURE CITED

DOTY, MAXWELL S. and M. OGURI
1958. Selected features of the isotopic carbon primary productivity technique. Rapports et Proces-Verbaux des reunions, Conseil Permanent International pour l'Exploration de la Mer 144: 47-55.

RICHARDS, FRANCIS A. and T. G. THOMPSON
1952. The estimation and characterization of plankton populations by pigment analyses. II. A spectrophotometric method for the estimation of plankton pigments. Journal of Marine Research 11(2): 156-172.

The tabulated data on carbon fixation and photosynthetic pigments are arranged in the chronological order of sampling. Unless otherwise specified, the samples were from the surface. Where the position of sampling is not specified, it is understood to be the same as that of the preceding sample.

The word "Carboy" appearing in the "Station" column of the table as a source of samples refers to three occasions during the cruise when a 5-gallon container was filled with surface water, from which samples were subsequently drawn at intervals to study the diurnal periodicity of production. The carboys were in each case filled at the position specified immediately before their first mention, and the subsamples were drawn from them and processed when regular surface samples were taken.

1/ Work done under contract at-(04-3)-15 with the U. S. Atomic Energy Commission.

The values in the table are to be regarded as preliminary and subject to correction when more refined methods of calculation have been applied to the data. The original data are in Notebook 36: 1-104, on file at the Botany Department, University of Hawaii.

Station	Time of sampling	Mg C/ hr./m.^{3}	Photosynthetic pigments					Astacine carotin-oids
			Chlorophyll -a	Chlorophyll -b	Chlorophyll -c	Carotin-oids	Total	
27°08'N 158°38'W	2005	.006 *.036	.5687	.4632	5.1590	-.3992	5.7917	.6141
30°00'N 158°50'W	1610	-.007	.7112	.5270	4.5598	-.3595	5.4385	.5953
Carboy 1	1605	.072	.2940	.5446	4.3476	-.3343	4.8519	.5555
30°58'N 158°52'W	2325	.019	.7239	.8382	3.0002	.1003	4.6626	.3965
Carboy 1	2320	.010	.8747	.6505	6.7292	-.3710	7.8834	.7120
32°25'N 158°50'W	0815	.061	2.0818	1.9135	12.8176	-1.1427	15.6702	1.7906
Carboy 1	0810	.070	1.4443	1.3056	6.4954	-.4827	8.7626	1.0088
34°01'N 158°54'W	2011		.8148	.4242	5.2352	-.1803	6.2939	.5001
20M	2014	.037				-.3346	-.3346	.4656
35°39'N 158°58'W	0823	.208				.0184	.0184	.1262
20M	0823	.317	.7995	.5018	4.3461	-.2667	5.3807	.5859
37°24'N 159°08'W	2010	.092				.0938	.0938	.0620
38°34'N 159°13'W	0805	.264	.4896	.4093	2.5934	-.4131	3.0792	.7174
20M	0805	.498	.5191	.0861	2.9825	-.1221	3.4656	.3290
40°10'N 159°19'W	0815	.863	1.0630	.9878	4.4640	-.3813	6.1335	.6909

* Average of two unusually widely different replicate values.

Station	Time of sampling	Mg C/ hr./m.^{3}	Photosynthetic pigments					Astacine carotin-oids
			Chlorophyll			Carotin-oids	Total	
			-a	-b	-c			
20M	0815	1.934	.6490	.0280	.6313	-.1959	1.1124	.4272
40°49'N 159°38'W	1935	.193	.2842	.4036	.9108	-.0139	1.5847	.2205
	0630	2.341	.3082	.3795	1.9179	-.0916	2.5140	.3268
41°20'N 159°56'W	1945	.276	.1018	.0851	.5390	-.5069	.2190	.3819
41°39'N 159°58'W	0832	1.202	1.6733	.6279	6.2003	-.4557	8.0458	.7366
20M	0832	1.292	.3209	.0712	.6249	-.0911	.9259	.3437
41°52'N 159°32'W	1932	.236	.5478	.3149	2.1213	-.0594	2.9246	.2409
41°25'N 158°57'W	0833	1.391	.2453	.1394	.4511	.0528	.8886	.1591
20M	0833	1.194	3.7189	2.1810	11.4684	-1.1189	16.2494	1.9668
41°09'N 158°24'W	1935	.305	1.1525	.9249	5.0781	-.3225	6.8330	.6962
41°20'N 158°22'W	0840	1.454	1.9707	1.6386	8.6419	-1.5397	10.7115	1.4325
20M	0840	1.357	.7322	.6120	3.8782	-.0089	5.2135	.3970
42°19'N 158°22'W	1945	.309	.3284	.0953	1.4297	.0832	1.9366	.1201
42°32'N 158°26'W	0833	1.333	1.0210	.7700	2.1332	.0365	3.9607	.3797
20M	0833	1.894	1.1660	.7110	5.7198	-.1240	7.4728	.5588
43°10'N 158°47'W	1950	.565	.4985	.2096	2.2822	-.0048	2.9855	.2358
43°24'N 158°46'W	0841	1.246	.6205	.2066	.8136	.0919	1.7326	.2271
20M	0841	1.409	.6052	1.2857	1.8394	-.2079	3.5224	.5978

Station	Time of sampling	Mg C/ hr./m.^{3}	Photosynthetic pigments					Astacine carotin-oids
			Chlorophyll			Carotin-oids	Total	
			-a	-b	-c			
44°16'N 158°57'W	1847	.543	.2256	.0626	.0782	.0986	.4650	.1227
43°49'N 159°54'W	0815	1.227 .668	.5315	.2629	.9406	.0431	1.7781	.2795
20M	0815	1.070	1.1238	.9996	6.2806	-.3061	8.0979	.8117
45°00'N 159°23'W	2010	.415	.5488	.1978	1.4835	-.1107	2.1194	.4668
46°10'N 159°41'W	0807	.931 .675	.4386	.4075	1.8420	-.0002	2.6879	.2385
20M	0807	.628	1.0997	.7695	4.0266	-.2799	5.6159	.5870
47°49'N 159°42'W	2025	.231	.3548	.3837	.8543	.0880	1.6808	.1408
49°12'N 159°46'W	0745	.539	.5771	.3521	1.9013	-.1446	2.6859	.3698
20M	0745	.524	.6454	.1430	1.2565	-.1291	1.9158	.5436
50°53'N 159°48'W	2033	.212 .439	.3428	.1688	1.8943	-.0590	2.3469	.2669
52°33'N 159°56'W	0854	.639	.6436	.4352	1.3400	-.0586	2.3602	.3569
20M	0854	.688	.5068	.2091	1.5141	-.0512	2.1788	.3835
52°44'N 161°04.5'W	0845	.466	.6885	.3532	2.4340	-.0740	3.4017	.3863
20M	0840	.584	.4972	.0215	.4836	.0884	1.0907	.2296
51°42'N 161°57'W	1620	.314	3.0233	2.5357	16.2381	-1.2595	20.5376	2.1560
Carboy 2	1615	.282	.4857	.1326	3.5513	.0125	4.1821	.3653
51°13.2'N 162°21.2'W	2000	.140	.5783	.4429	4.1155	-.2162	4.9205	.4422
Carboy 2	2005	.135	.6297	.1902	1.5014	-.0995	2.2218	.3367

Station	Time of sampling	Mg.C/ hr./m.^{3}	Photosynthetic pigments					Astacine carotin-oids
			Chlorophyll			Carotin-oids	Total	
			-a	-b	-c			
20M	2000	.202 .295	.5476	.8817	3.8608	-.3274	4.9627	.7151
50°41'N 162°48'W	2438	.308	.2891	.2005	-.4319	-.0124	.9091	.2391
Carboy 2	2430	.124	.3301	.2127	2.4903	.0789	3.1120	.2879
50°15.2'N 164°12'W	0815	.414	.2854	.2386	1.5119	-.1010	1.9349	.3949
Carboy 2	0913	.123	.3558	.6323	3.7112	-.1224	4.5769	.4367
20M	0822	.435	.7613	.5292	2.8759	-.2047	3.9617	.5398
50°05'N 166°43.5'W	2005	.742	.5027	.1467	1.1708	.1001	1.9203	.1606
49°53.5'N 169°19.5'W	0815	.457 .712	.5094	.0187	5.0960	-.1584	5.4657	.4531
49°45'N 171°46'W	2005	.562 .294	.8556	.6034	3.6136	-.2801	4.7925	.4987
50°00'N 174°03'W	0815	1.139	1.9260	1.4818	8.2159	-.6615	10.9622	1.1273
48°41.5'N 174°41.5'W	2005	.365	.5103	.3674	1.8755	-.0453	2.7079	.3339
47°14'N 174°56'W	0809	.709	.6606	.4720	3.0612	-.1590	4.0348	.3927
20M	0809	.827	.4454	.3724	2.3594	-.0791	3.0981	.4575
46°12'N 174°56'W	2000	.384	2.0628	2.1291	6.1682	-.8975	9.4626	1.4518
46°02.3'N 174°56.5'W	0810	.489	.4909	.3525	4.7959	-.3662	5.2731	.6319
20M	0810	.398	3.9040	3.6363	20.6902	-1.8119	26.4186	2.7997
45°12'N 174°53'W	1925	.402	.3441	.4639	1.7047	-.2256	2.2871	.4088
45°08'N 174°44'W	0835	.469	.2995	.3817	3.1645	-.1493	3.6964	.3569

Station	Time of sampling	Mg C/ hr./m.^{3}	Photosynthetic pigments					Astacine carotin-oids
			Chlorophyll			Carotin-oids	Total	
			-a	-b	-c			
24M	0845	.245	.1803	.0744	.5385	-.3533	.4399	.8027
31M	0845	.186	.4465	.4380	.9695	-.3363	1.5177	.8704
44°39'N 174°48'W	1940	.422	.4678	.4409	1.8918	-.0108	2.7897	.2699
44°24'N 174°40'W	0815	.597 .924	1.9040	1.5547	9.1005	-.8063	11.7529	1.3914
20M	0815	1.079	.3913	.2111	-.1378	.0885	.5531	.2501
43°29'N 174°48'W	1920	.560	.4040	.1344	1.3791	-.0431	1.8744	.2650
43°22'N 174°43.5'W	0835	.958	.3979	.1959	2.1992	-.0380	2.7550	.2899
20M	0835	1.060	.6082	.4202	4.2589	-.4820	4.8053	.8155
43°22'N 174°43'W.	1935	.615	.6312	.3369	2.6294	-.0191	3.5784	.3351
43°20'N 174°45'W	0805	.968	.3341	.2347	3.2088	-.0238	3.7538	.2574
20M	0805	.608	.5615	.0524	2.6310	.0517	3.2966	.2195
42°48'N 175°08'W	1950	.412	1.2090	.9920	6.6222	-.4018	8.4214	.8473
20M	1950	.334	.5888	.4922	3.1188	-.0642	4.1356	.4023
42°46'N 175°08'W	0900 1015	.512	2.0548	1.8246	9.6273	-.8236	12.6831	1.4468
2M		.474	.4320	.2216	1.5272	-.0659	2.1149	.3754
6M		.651	.2650	.2982	1.1292	-.0815	1.6109	.3505
12M		.696	.2242	.2687	.8193	.0647	1.3769	.1954
20M		.641	.5236	.4037	3.1723	-.1593	3.9403	.5081
25M		.312	.4870	.3662	1.4906	-.0598	2.2840	.4151

Station	Time of sampling	Mg C/ hr./m.^{3}	Photosynthetic pigments					Astacine carotin-oids
			Chlorophyll			Carotin-oids	Total	
			-a	-b	-c			
39M		.371	.3152	.0699	.6138	.0162	1.0151	.3428
42°48'N 175°02'W	1940	.119 .417	.3835	.1113	1.6694	.0303	2.1945	.2303
42°42'N 175°11'W	0738	.872	1.1993	.8451	5.1572	-.5331	6.6685	1.0280
20M	0738	.973	.4036	-.0707	1.8017	-.0796	2.0550	.2964
41°35'N 175°08'W	1925	.401	.3938	.4432	.7464	.0399	1.6233	.1791
41°28'N 175°06'W	0815	.805	.9628	.9074	3.8936	-.5257	5.2381	.9327
20M	0815	1.281	.7638	.6420	1.6083	.1320	3.1461	.2567
41°28'N 175°06'W	1350 63.0°F	.765	.5127	.2444	3.0926	-.0550	3.7947	.3146
20M	1350 63.0°F	.768	.8155	.2485	3.9632	-.2965	4.7307	.6195
0M	1415 61.7°F	.985	.1472	.1231	.7797	-.3947	.6553	.9536
20M	1415 61.7°F	.980	.3513	-.0765	.8322	-.1804	.9266	.4577
0M	1437 61.8°F	1.031	.7059	.6321	1.5866	-.2029	2.7217	.5335
0M	1449 62.1°F	1.023	.4150	.7573	3.3812	-.1920	4.3615	.5624
0M	1505 62.2°F	.944	.1170	.0039	1.7238	.0784	1.9231	.2562
0M	1515 62.7°F	1.039	1.0000	.9124	4.3943	-.2778	6.0289	.6446
41°33'N 175°02'W	1100	.605	2.1328	1.8835	12.3831	-1.0122	15.3872	1.6641
20M	1100	.933	1.2318	1.1025	5.6885	-.3019	7.7009	.8031

Station	Time of sampling	Mg C/ hr./m.^{3}	Photosynthetic pigments					Astacine carotin-oids
			Chlorophyll			Carotin-oids	Total	
			-a	-b	-c			
41°39'N 175°06'W	1335	.839	.9602	.7037	4.5461	-.2883	5.9217	.7423
20M	1335	.642	.9180	.1197	.6791	.2955	2.0123	.1302
41°43'N 175°09'W	1422	.956 .692	.2834	.1976	.8097	-.1949	1.0958	.4468
20M	1422	.746	.5047	.1653	1.0612	-.0180	1.7132	.2848
41°50'N 175°15'W	1555	.700	1.0490	1.0838	5.9148	-.4103	7.6373	.7940
20M	1555	.856	1.3774	.9094	5.4583	-.2870	7.4581	.7927
41°52'N 175°08'W	2020	.310	3.6271	2.7616	22.3919	-1.4828	27.2978	2.5935
41°28'N 175°10'W	0812	.771	1.1945	.8601	6.5217	-.3944	8.1819	.8116
20M	0812	.947	.1421	.1188	.7526	-.0344	.9791	.2247
40°29'N 175°11'W	1920	.189	.6773	.3390	3.1946	-.1693	4.0416	.4394
38°52'N 175°06'W	0820	.311	.5029	.8098	3.5460	-.2975	4.5612	.5861
20M	0820	.140 .015	.6603	.1265	4.6530	-.2123	5.2275	.5510
38°07'N 174°34'W	1552	.104 .310	.5581	.4865	2.7216	-.0085	3.7577	.3784
Carboy 3	1555	.080	1.7689	1.6235	11.6117	.7931	15.7972	1.4550
38°28'N 173°43'W	2010	.102	.5719	.1871	3.2239	-.3526	3.6303	.8170
Carboy 3	2005	.018	.1132	.3580	.7086	.0531	1.2329	.1882
38°45'N 173°04'W Carboy 3	2350	.032	.5165	.4318	2.7357	-.2405	3.4435	.5299

Station	Time of sampling	Mg C/ hr./m.^{3}	Photosynthetic pigments					Astacine carotin-oids
			Chlorophyll			Carotin-oids	Total	
			-a	-b	-c			
39°18'N 171°32.5'W	0800	.332	.5452	.5199	2.1339	-.1439	3.0551	.3874
20M	0800	.350	.2518	.2495	1.5467	-.0961	1.9519	.2946
39°50'N 170°52'W	1940	.156 .242	1.4479	1.4694	6.4536	-.4770	8.8939	.9604
40°03'N 170°42'W 20M	0820	1.102	1.1669	.9541	6.4297	-.3707	8.1800	.7748
40°15'N 170°16'W	1950	.048	.6996	.2979	3.8976	-.4545	4.4406	.7246
40°15'N 170°16'W	0830	.640	.7201	.6914	2.7636	-.0374	4.1377	.3972
4M	0830	.418	1.5867	1.5135	7.7347	-.8597	9.9752	1.4447
9M	0830-0900	.305	.0401	.1530	.9350	.1284	1.2565	.1365
40M	0830-0845	.383	.8252	.1382	2.7879	-.5040	3.2473	.6558
62M	0830-0900	.202	.1576	.0906	.6105	-.1730	.6857	.2579
40°58'N 170°16'W	2025	.221	.9508	.7832	3.4475	-.2236	4.9579	.5504
41°26'N 170°38'W	0840	.346 .607	.3855	.5224	1.8008	-.1116	2.5971	.2579
20M	0840	1.141 .823	.6573	.5072	3.2513	-.1254	4.2904	.5101
42°21'N 170°12'W	2000	.290	.2777	.0649	-.3974	.2035	.1487	.0062
42°21'N 170°12'W	0835	.886				.2126	.2126	.1906
3M	0840	.777	1.0082	.7001	4.0752	-.1358	5.6477	.6043
14M	0850	.754	.3328	.0718	.6304	-.1450	.8900	.6106

Station	Time of sampling	Mg C/ hr./m.^{3}	Photosynthetic pigments					Astacine carotin-oids
			Chlorophyll			Carotin-oids	Total	
			-a	-b	-c			
24M	0855	.839	.3422	.2269	1.4898	.0545	2.1134	.2237
30M	0835-0915	.344 .208	.1445	.1734	.1456	.3007	.7642	-.0545
42°47'N 169°57'W	2007	.348	.3278	.0564	.5491	.0749	1.0082	.2130
42°56'N 169°56'W	0825	.930	.4939	.8197	.7742	-.1662	1.9216	.5022
20M	0825	.717	.2013	-.1999	1.3124	.1771	1.4909	.2206
44°05'N 169°21'W	2020	,283 .492	.4761	.5475	.7636	-.0166	1.7706	.3132
44°40.5'N 168°35'W	0912	.671	1.6588	1.2650	9.2219	-1.1854	10.9603	1.4005
45°46'N 168°46'W	1920	.429	.6628	.1544	2.4451	-.1133	3.1490	.4116
45°58'N 166°16'W	0820	.972	.5212	.4150	3.0040	-.1077	3.8325	.2930
20M	0820	.957	.4212	.5688	-.3168	.2349	.9081	.0567
46°34'N 164°47'W	1955	.296	1.6486	1.3537	8.0823	-.4699	10.6147	1.0768
46°34'N 164°28'W	0930	.550	.6545	.6444	2.3230	.0325	3.6544	.3458
3M	0905	.525	.4107	.1865	.2906	.1863	1.0741	.0600
7M	0910	.582	.6748	.4628	1.6426	.0755	2.8557	.2473
14M	0915	.562	.2778	.2322	1.4713	.1502	2.1315	.0942
23M	0920	.281	.4416	.2225	-.7774	.1707	.0574	.0811
30M	0905-0930	.214	.6072	.4930	4.2620	-.1531	5.2091	.5135
45°52'N 164°37'W	2005	.335	1.1575	.7093	4.1700	-.1381	5.8987	.5108

Station	Time of sampling	Mg C/ hr./$m.^3$	Photosynthetic pigments					Astacine carotin-oids
			Chlorophyll			Carotin-oids	Total	
			-a	-b	-c			
44°58'N 165°06'W	0835	1.020	.6211	.2563	1.8556	-.4760	2.2570	1.3021
20M	0835	1.172	1.0738	.2688	6.2362	-.2964	7.2824	.7728
42°09.5'N 163°48'W	0757	.922	.3448	.2284	.9906	.0933	1.6571	.1964
40°26.5'N 163°35.5'W	1958	.262	.9040	.8520	3.6560	-.2984	5.1136	.6350
38°23.5'N 163°20'W	0800	.561 .806	1.5440	.8894	6.3445	-.5588	8.2191	.9059
36°20'N 162°50'W	2000	.102	.4682	.3912	2.4796	-.2711	3.0679	.4264
34°48.5'N 162°12.5'W	0800	.438	.2317	.1937	1.2272	.3629	2.0155	.0427
31°04'N 160°49'W	0800	.156	.5800	.4840	.5313	-.0743	1.5210	.4211
29°05.5'N 160°20'W	2000	-.028	1.9419	1.8155	11.0323	-.8396	13.9501	1.4169
27°02.5'N 159°45.5'W	0800	.165	.2293	.1206	1.2618	-.0560	1.5557	.2522
25°14'N 159°06'W	2000	.023	.0519	.0017	.7645	-.0448	.7733	.1040
23°18'N 158°35'W	0800	.118	.3574	.2102	.2033	.1616	.9325	.1072
20M	0815	.649	.9426	.2330	4.3431	-.1164	5.4023	.3829